AN INVESTIGATION OF AUDITOR'S PERCEPTIONS AND
DECISION PROCESSES REGARDING EVALUATION OF
MATERIAL INTERNAL ACCOUNTING CONTROL WEAKNESSES

BY

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AN INVESTIGATION OF AUDITOR'S PERCEPTIONS AND
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This dissertation explored the auditor's judgment process in
making an internal accounting control weakness (IACW) materiality
decision. The auditing literature clearly has indicated the im-
portance of judgment to this type of decision. The two general
objectives of this study were 1) to develop a conceptual framework
which related the concept of materiality to the auditor's evaluation
of IACWs, and 2) to empirically test some implications of this
framework using a human information processing methodology.

The development of the conceptual framework required an ex-
tensive review of both the internal control literature and the
materiality literature. A simple, yet rigorous, definition of
materiality formed an important part of this framework. The concept
of materiality was defined as

        The perceived importance of a difference between
    an existing state of nature and some other (generally
    a standard or ideal) conceived state of nature.

The auditor's evaluation of the materiality of an IACW was presumed
to consist of the following two components: 1) the auditor's es-
timation of the expected dollar exposure due to the IACW, and
2) the auditor's evaluation of the importance of the expected dollar
exposure (i.e., the comparison of the expected dollar exposure to
the auditor's materiality threshold). The conceptual framework
led to the selection of a set of factors considered potentially
relevant to the auditor's IACW materiality judgment. The factors
were relevant to estimating either the probability or dollar exposure
of errors due to an IACW. Three of the selected factors (two
probability oriented factors and one dollar exposure oriented
factor) were incorporated into an experiment relating to auditors'
IACW materiality judgments.

The experiment provided a mechanism by which the study could
evaluate the importance of the materiality factors to the auditors'
IACW materiality judgments, examine the extent of judgment consensus,
and assess the extent of auditors' self-insight into their judgment
process. Thirty-eight auditors participated in the experiment. The
auditors evaluated the materiality of 12 IACWs using a pairwise com-
parison procedure and a single rating procedure.

The major results of the experiment indicated 1) the ANOVA
models explained a high proportion of variance in the auditor's IACW
materiality judgments, 2) individual differences existed among the
auditors concerning the importance of each materiality factor,
3) substantial configural processing in regards to the two probability
oriented factors, 4) a moderate degree of consensus among the auditors,
and 5) a low degree of self-insight. The above results are subject to
the many limitations discussed throughout the study.

In summary, this research has provided some insights into the IACW materiality decision and the concept of materiality. This dissertation has shown that abstract judgment situations can be examined empirically, with some rigor. Since this dissertation was only an exploratory study, no conclusion was made in regard to the need for guidance in the auditor's IACW materiality judgment. It is hoped only that this study will provide some assistance to future research that examines the concept of materiality and the auditor's judgment process in IAC evaluation.

Nature of the Study

This study concerns a particular type of professional judgment exercised by auditors: the assessment of the materiality of internal accounting control weaknesses (IACWs). This opening chapter is intended to show that the materiality judgment:

1) is of current significance and is growing in importance;

2) is one for which there is little authoritative guidance provided the auditor; and

3) is one where empirical research (hitherto not performed) could aid the development of effective authoritative guidelines.

Professional Judgment

The auditor relies heavily upon his personal judgment in the collection and evaluation of evidence in an audit engagement. This is referred to as the application of professional audit judgment. Professional judgment represents the decision process the auditor uses in the evaluation of evidence and in analyzing the effect of internal accounting controls (IACs) on the audit. It is generally agreed that professional judgment plays a major role in auditing and deserves academic inquiry. This is supported by Bernstein [1967, p. 90] when he says:

> Judgment is, of course, a vital part of any professional
> work. In accounting it plays an important role every
> step of the way. But that does not mean that it is a
> mysterious process, undefinable and inexplicable. We
> know that the processes that feed judgment are varied
> and complex, yet it does not follow that we cannot
> make some progress in their analysis and description.

Recent empirical research concerning professional judgment has examined the auditor's judgment process (e.g., Ashton [1973]; Joyce [1976]; Messier [1979]). Common purposes underlying these studies are to determine if auditors can make consistent judgments and to describe what cues (factors) are important in the auditor's decision process. By addressing these issues, researchers have sought evidence as to the need for guidance in specific professional judgments made by auditors. The prior studies have used a methodology that models the auditor's judgment process and indicates the consistency of auditor's judgments. The underlying assumption has been that if inconsistencies are found in auditors' judgments, then more authoritative guidance is needed to eliminate the inconsistencies. It is assumed also that the judgment models obtained may help policy makers establish this authoritative guidance. The present study constitutes a continuation of empirical efforts to enhance understanding of professional audit judgment.

Materiality Judgments

Numerous and important professional judgments by the auditor frequently concern the determination of the materiality of an event. This is borne out by the American Institute of Certified Public Accountants' [AICPA, 1973] codified Statement on Auditing Standards Section 150.04 (SAS), which states, "[T]he concept of materiality is inherent in the work of the independent auditor." The materiality concept is normally thought of in relation to the average user; that is, an

event is material if knowledge of that event would cause some dif-
ferential action to be taken by an average user. However, it is
not the user who makes the materiality judgment, but the auditor
(or preparer), who must make it for the user.

The most common materiality judgment examined concerns the
auditor's evaluation of an item related to the current year's audit
of the financial statements. Specifically, researchers have examined
the auditors' materiality judgments related to a disclosure of an event
or a correction of an error related to the financial statements of the
current period. Several empirical studies have been performed in these
"financial reporting" contexts and these will be summarized in Chapter
II (e.g., Boatsman and Robertson [1974]; Hofstedt and Hughes [1977]).
However, their findings clearly cannot be generalized to other auditing
contexts. Factors related to the general concept of materiality have
not been put into a coherent framework and the judgment has been
categorized merely as within the realm of subjective professional
judgment [Financial Accounting Standards Board (FASB), Discussion
Memorandum, 1975]. A major purpose of this study is to rectify the
lack of precision with which the materiality concept has been addressed.

Significance of the IACW Materiality Judgment

Recent developments have created a renewed interest in the
auditor's evaluation of internal accounting controls and especially
IACWs. Traditionally, the auditor's primary purpose in the study and
evaluation of IACs was to establish a basis for reliance on the IACs
in order to assist him in determining the nature, timing, and extent
of auditing procedures to be performed in the examination of financial
statements. Thus the auditor was required to review an IAC system and

perform compliance tests only if he planned to rely on the internal control as it related to the audited financial statements. The following section highlights current developments which appear to expand the traditional responsibilities of auditors in the study and evaluation of IACs.

Statement on Auditing Standards Number 20

In 1977 the purpose of the IAC review was extended by the AICPA's Statement on Auditing Standards Number 20, "Required Communication of Material Weaknesses in Internal Accounting Controls" (SAS No. 20). SAS No. 20 established a requirement that:

> . . .the auditor communicate to senior management and the board of directors cr its audit committee material weaknesses in internal accounting control that come to his attention during an examination of financial statements made in accordance with generally accepted auditing standards. [emphasis added--AICPA, 1977, p. 1]

Prior to this statement, it was common for auditors to issue management letters which contained their reservations and recommendations concerning IACWs discovered during the audit engagement. The significance of SAS No. 20 lies in the explicit requirement to consider material weaknesses and communicate them to the board of directors.

The Cohen Commission

The proposals concerning the auditor's responsibility in relation to IACs as presented by the AICPA's Cohen Commission go beyond SAS No. 20. The Commission was one of the first advocates of public reporting on the IAC system and of disclosure of material weaknesses. In the Commissions' Report, "The Commission on Auditor's Responsibilities: Report, Conclusions, and Recommendations" they recommended:

1) that management should include an assessment of all internal

accounting controls in the financial statements and 2) the independent

auditor should state in his report whether he agrees or disagrees

with management's description, and should describe any material

uncorrected weaknesses not disclosed by management [AICPA, 1978a,

pp. 60-63].

Foreign Corrupt Practices Act of 1977

The public sector recently became involved in the issue of

evaluation of IAC through the Foreign Corrupt Practices Act of 1977.

Although this Act does not directly concern the auditor's evaluation

of IAC and IACWs, it will most likely influence the auditor's

judgments. The Act requires publically held companies to maintain

adequate IACs to provide "reasonable assurances" that the following

objectives are met:

1) transactions have management's general or specific
    authorizations.

2) transactions are properly recorded to permit preparation
    of financial statements and accountability of assets.

3) access to assets have proper authorization.

4) the recording of assets and accountability of assets
    are verified and differences are reconciled.

The above objectives are specified without materiality limits or guide-

lines being provided to judge compliance with the Act. It is reasonable

to assume that the independent auditor will assist management in

complying with the Act; indeed, the above objectives are identical with

the definitional objectives of "Accounting Control" as stated in the

AICPA's SAS No. 1, section 320.28. The primary difference is that

these objectives now have the force of law, under the jurisdiction of

the Securities and Exchange Commission (SEC).

The SEC

In response to the Foreign Corrupt Practices Act the SEC advocated public reporting on IAC systems--by management, but with direct involvement of auditors. Initially the SEC sought to require management to issue a report concerning the adequacy of IACs and to require the auditor to issue an opinion on management's statement on IACs. In late 1979, however, the SEC withdrew a proposal concerning these requirements. Among the reasons for withdrawing the proposal included 1) that there were no materiality standards included in the proposal; and 2) the SEC was presently satisfied as to the number of companies issuing voluntary management reports that included a statement about IACs [Business Week, 1979 and Ernst and Whinney, 1980]. Nevertheless, the SEC have stated that they expect the outside auditor to eventually become involved with IAC reports and that management or auditors will be responsible for the public reporting of material IACWs [Ernst and Whinney, 1980].

Statement on Auditing Standards Number 30

In 1980 the AICPA issued Statement on Auditing Standards Number 30 (SAS No. 30), "Reporting on Internal Accounting Control." This statement described the procedures to be applied by the auditor when issuing reports concerning IACs for either special reports or normal audit engagements. Included in the procedures were the requirements that auditors identify IACWs in the accounting system and evaluate the materiality of the individual IACWs. The auditor also is to include a description of the material IACWs in his report. These reports are not considered to be public reports but are intended solely for management, specified regulatory agencies or other specified third parties.

Significance of Changing Responsibilities

The foregoing indicates that auditors' judgments related to IAC
and IACWs extend beyond the traditional responsibilities described
earlier. The evaluation of IACWs has become a much more explicit
task for the auditor. The determination of whether IACWs, once
identified, are material or not represents an increasingly important
task for auditors; both because of the requirements imposed by
SAS No. 20 and SAS No. 30, and because of the possibility that public
disclosure will become a reality.

Nature of the IACW Materiality Judgment

Elements of the Judgment

The particular judgment of interest brings together two basic
auditing concepts, IACWs and materiality. An IACW is defined as the
"absence of controls" which may lead to an error or irregularity
[Arens and Loebbecke, 1976, p. 177]. Materiality, from the auditor's
view, typically deals with dollar significance to the financial
statements. In combining these two concepts SAS No. 1 describes a
material IACW as follows:

> . . .a condition in which the specific control procedures
> or the degree of compliance with them do not reduce to
> a relatively low level the risk that errors or ir-
> regularities in amounts that would be material in
> relation to the financial statements being audited may
> occur and not be detected within a timely period by
> employees in the normal course of performing their
> assigned functions.
>
> [section 320.68]

Given this description, then, it follows that the judgment requires
the auditor to assess the probability of an error or irregularity
occurring, that would (a) not be corrected on a timely basis in the

normal course of business, and (b) would materially affect the financial statements.[1] Both the probability assessment and the assessment of the materiality to the financial statements are unlikely to be direct and explicit judgments. Instead from available evidence it seems likely that the auditor uses both quantitative and qualitative factors as surrogates for the concepts contained in the material IACW description. Furthermore, the description highlights that two important factors in judging the materiality of an IACW are probability and dollar exposure of the potential errors and ir-regularities.

Auditor's Decision Process

In order to understand the likely decision process followed by auditors in evaluating material IACWs, the auditors' evaluation of the IAC system must first be understood. A review of the authoritative literature (e.g., SAS's) and descriptions of the auditor's decision process in recent auditing textbooks (e.g., Arens and Loebbecke, [1976 and 1980]; Robertson [1979]) provide some guidance in this respect. The general perception seems to be that the auditor's evaluation of IAC is made to satisfy the second standard of field-work as provided in SAS No. 1 (a proper study and evaluation of IAC) and to satisfy the objectives previously mentioned in the Foreign Corrupt Practices Act section of this chapter. The essence of these objectives is that the auditor should be satisfied that the IAC system provides reasonable assurances that: 1) transactions are authorized and properly recorded; and 2) assets are safeguarded, properly accounted for, and that access to the assets are authorized.

In order to satisfy these objectives the auditor will partition the IAC system into different cycles (e.g., sales and receivables, cash disbursements and inventory). For each cycle the auditor will go through a three-step evaluation process:

1) preliminary evaluation--understanding the system as given by the client.

2) compliance testing and re-evaluation--assessing whether the system works as given to the auditor.

3) audit tests of account balances (substantive tests), re-evaluation if needed, and reporting of final recommendations.

The preliminary evaluation may consist of IAC questionnaires, decision tables, flowcharts and/or a walk-through of the system. The auditor will evaluate this evidence to see how well the system conforms to the overall IAC objectives. At this time the auditor will identify weaknesses in the IAC system and any strengths that may compensate for these weaknesses (i.e., compensating controls).

Once the auditor obtains an understanding of how the IAC system should be operating, there are three courses the auditor may pursue. First, if the auditor perceives that he may rely on the IAC system for the audit, he will then perform compliance tests to determine if the IAC system is functioning as described to him. Second, if the auditor concludes the system is too unreliable or weak, but that the client is still capable of being audited, the auditor then will go directly to the audit tests of account balances. Finally, if the auditor judges that the system is too unreliable to meet any of the objectives of IAC and the client is incapable of an audit, he will issue a disclaimer or withdraw from the engagement.

If the first or second courses on the previous page are taken, the auditor will develop his audit tests of account balances based on the reliability placed on the IAC systems. During these tests the auditor may obtain additional insight into the IAC systems and re-evaluate any weaknesses originally documented. Finally after completing the account balance tests and issuing an opinion, the auditor will summarize the material IACWs identified during the audit and suggest any recommendations and improvements to management or other interested parties in compliance with SAS No. 20.[2]

In this process the auditor may become aware of material IACWs "through his initial review of the system, ... by performing such tests of compliance with [the clients] prescribed procedures, ... and by performing substantive tests" [AICPA, 1977, pp. 2-3]. The evaluation of material IACWs clearly constitutes a sequential process that takes place throughout the audit: the process is summarized in Figure 1.1 (adapted from Robertson [1979, p. 190]).

Given the sequential judgment process described above, the final materiality judgment of an IACW represents a complex task which would be difficult to study in a single experiment. Accordingly, this study attempts only to examine the auditor's IACW materiality judgment in the context of the auditor's preliminary IAC evaluation (i.e., his initial review).

Statement of the Problem

Auditors normally are accustomed to dealing with materiality as it relates to account balances and some specific dollar value criteria. When the materiality concept is applied to an IACW it becomes additionally abstract. Mautz and Sharaf [1961] state:

Phases of Study and Evaluation of Information System Control
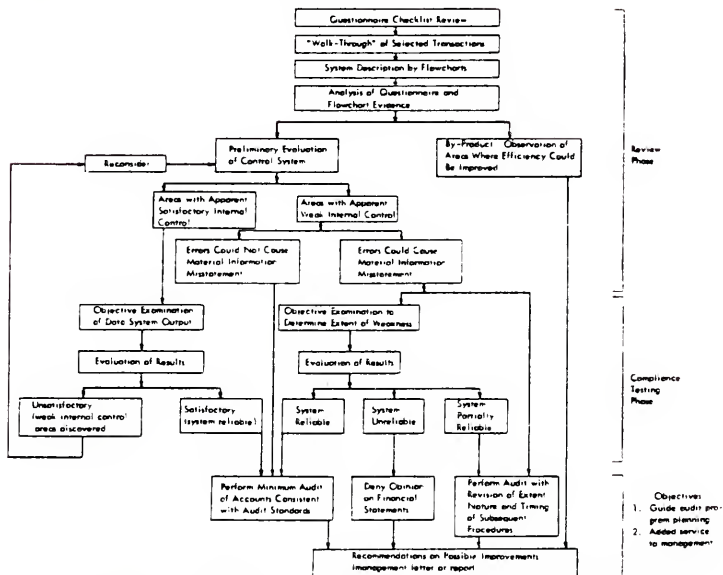
Source Adapted from R. I. Anderson, "Analytical Auditing Does It Work?" *The Internal Auditor*, July/August 1972. Copyright 1972 by The Institute of Internal Auditors, Inc., 249 Maitland Ave., Altamonte Springs, Florida Reprinted with permission

FIGURE 1.1
OVERVIEW OF THE AUDITOR'S DECISION PROCESS

> Materiality, as applied to irregularities, is thus an abstract and difficult concept. . . . First, our idea of materiality with respect to irregularities may be somewhat different from our idea of materiality with respect to financial condition and results of operations. Second, it seems apparent that even within this idea of materiality there may be some irregularities that are sufficiently immaterial to be of little significance to anyone.
>
> [p. 119]

Unfortunately Mautz and Sharaf never directly address the problem of how the auditor is to judge the materiality of an IACW. They postulate that the judgment deals with probabilities that the internal control system will fail to detect material irregularities, but this still leaves us with the problem of judging materiality. They conclude that the evaluation of material IACWs remains the individual auditor's professional judgment of the meaning of materiality.

The description of materiality given in SAS No. 1 (previously mentioned) is ambiguous in that it does not establish clear boundaries or guidelines within which to evaluate a material IACW. SAS No. 20 relies on this description in the requirement that auditors must communicate material IACWs to senior management and the board of directors. The auditor, as one committee member noted in his qualification to the standard, is left with a major problem: that the existing literature does not provide sufficient guidance or criteria "for the auditor to measure objectively and uniformly the materiality of weaknesses in systems of internal accounting control" [AICPA, 1977, p. 10]. SAS No. 30 also relies on this description of a material IACW and the statement does not provide further specific guidance to the auditor in his materiality judgment.[3]

As the previous indicates, the identification of a material IACW requires a subjective professional judgment and one for which the professional literature presently provides little guidance. Furthermore, since this judgment process has not been empirically explored to date, the variables that auditors consider important to the judgment are unknown. That is, it is not known what judgment factors (cues) are used by auditors, the relative importance of the cues, or with what consistency they are applied across auditors and audit engagements. Considering the present audit environment (e.g., SAS No. 20) and legal environment (e.g., Foreign Corrupt Practices Act), auditors may need a specific set of criteria to guide them in their evaluation of material IACWs. In order to assess this need, empirical insight into the auditor's judgment of material IACWs is called for, and indeed, the major objective of this dissertation is to obtain this insight. This study of the auditor's judgment is carried out in the same vein as recent empirical studies concerning auditor's judgments (e.g., Ashton [1974]; Joyce [1976]; Messier [1979]), although the specific task context to be examined differs markedly from those examined in earlier work.

Research Questions Addressed

The overall objective of this study is to obtain insight into the auditor's IACW materiality judgment. In order to meet this objective, answers are obtained to the following specific descriptive research questions:

1) What factors are likely to be perceived by the auditor to be important in the IACW materiality judgment?

2) Can the auditor's judgment of the materiality of IACWs be described by a mathematical model?

3)   Is there consensus across auditors (consistency across auditors)?

4)   How well does the auditor perceive his judgment process?

Answers to these questions should provide a basis from which to evaluate the need for formal criteria in this judgment and may indicate the type of criteria presently used by auditors.

Judgment Factors

Factors that the auditor may use in the IACW materiality decision have not been clearly defined. Because of the lack of clear definitions this would allow considerable individual discretion on the part of the auditor. Greater progress may be possible if the specific judgment situation is incorporated explicitly within the framework of the general concept of materiality, rather than being viewed as an isolated issue. Placing the judgment of the materiality of an IACW within a broader framework may itself lead to the identification of factors to be considered in that judgment. However, the major benefit of the framework will be that it will facilitate the process of describing, evaluating and relating the various factors.

Identifying the factors perceived to be important in the material IACW judgment will facilitate assessment of the practicality of establishing formal criteria for this judgment. A prerequisite in establishing formal criteria for any judgment is that the identified factors are understandable to auditors and have the capability of being used by them. Identifying the factors perceived to be important and used by auditors will indicate the feasibility of establishing clearer guidelines in this professional judgment.

Descriptive Models of the Judgment Process

This study follows the lead of a well established body of literature in judgment research (see Slovic and Lichtenstein [1971]). Individual linear models are developed for auditors' judgments of material IACWs. These models do not purport to explain an individual's real cognitive processes; rather they describe a linear relationship between the judgments and the factors. That is, the models will indicate (a) whether the auditor's decisions can be explained by an additive linear model, (b) the significance of the factors in his judgment and (c) how the factors were weighted and inter-related.

These individual models are important in two aspects. First, the individual models developed may be useful in explaining why there were differences between the auditors' judgments. These differences would be reflected in the models by the different weights the auditors may place on the various factors. Second, they may provide direction for future research, in that if a set of factors is determined to be explanatory of this process, then future research can concentrate on how the auditor functionally relates the different factors and integrates them into a final judgment. This may indicate how to establish normative standards in order to optimize this decision process.

Consensus

In this study consensus is defined as the agreement across auditors for a given judgment task. If inconsistencies (i.e., disagreement between auditors) show up in auditors' judgments, this may be harmful to the profession. Mautz and Sharaf [1961, p. 4]

point out that "inconsistencies have no place in auditing in the long run" and that "if we are to have a profession worthy of the name we must work to eliminate them." Ashton [1973, pp. 23-25] indicates that users who rely on auditors' judgments should at least expect auditors to make consistent judgments. He also mentions that if inconsistent judgments are made this "will cause the cost and/or quality of the audit to fluctuate--assuming that all other factors are equal." Therefore, if inconsistencies are found, this supports the proposition that clearer guidelines need to be established in this judgmental area.

Auditor's Self-Insight into the Judgment Process

The last research question examines the extent to which auditors have insight into their judgment policies. If low self-insight is found, this may indicate that auditors have a difficult time communicating the importance of factors they use in the materiality judgment of an IACW. Messier [1979] has suggested low self-insight has two possible ramifications: 1) the auditor will have a more difficult time in training subordinates regarding this type of judgment; and 2) the auditor may mislead any authoritative body which attempts to establish guidelines for this judgment, due to his inability to communicate the important factors related to the judgment.

Methodology

In order to find the answers to the research questions, the dissertation study involved 1) a thorough review of the general materiality and IAC related literature to identify and synthesize

the factors that may be of relevance to judgments of the materiality of IACWs; 2) interviews with a small sample of CPAs to determine factors that they perceive important to judgments of the materiality of IACWs; and 3) a field experiment to assess the impact of factors on materiality judgments by auditors.

Pre-Experimental

The pre-experimental work provided an answer to the first research question about the factors perceived to be potentially important to the auditor in an IACW materiality judgment. This was accomplished by a thorough review of the literature which merged the judgment of a material IACW into the general concept of materiality (see Chapter II). The review generated a list of factors which were incorporated into an interview instrument. The results of detailed interviews with a small sample of auditors enabled a final list of factors to be developed. These factors were then considered in the design of the field experiment.

The Field Experiment

In order to answer the last three research questions, a field experiment was designed to enable the use of a well established research methodology. The design was based on a pairwise comparison procedure in which subjects (auditors) made comparative judgments of the materiality of several IACW cases. The factors manipulated in the cases were those derived from the pre-experimental portion of the study. Each individual auditor's judgments were then modeled using analysis of variance (ANOVA). The ANOVA results apply to the second research question, for they 1) represent the auditors'

judgment processes, 2) showed how much of the variance of the auditors' judgments could be explained, and 3) gave the factor weightings for the auditor's judgment (i.e., objective weightings).

The remaining two research questions were concerned with the consensus among the auditors' judgments and the self-insight auditors had into their judgment processes. The consensus measure indicates the extent of agreement the auditors display in the materiality ratings of the IACW cases. This was measured by a rank correlation measure (i.e., Kendall's Coefficient of Concordance W). The final measure, self-insight, is the amount of insight each auditor has into the factors he used in making the materiality judgment of an IACW case. This measure was obtained by correlating the subjective weightings the auditor placed on the experimental factors to the auditor's model weightings on these factors.

Scope Limitations

Any empirical research must limit the amount of information obtained due to subject, time, cost, and other experimental constraints. Also, considering this study was exploratory in nature, only an initial insight into the auditor's judgments of the materiality of an IACW can be expected. In order to make the experiment operational, the auditor's environment surrounding the judgment was simplified. Specifically, two simplifications were made concerning the auditor's decision environment. First, each IACW case was considered independent of each other, with no compensating strengths offsetting the weakness. The primary reason for this was that there is no way to separate the effect of

compensating strengths from the materiality factors in the auditor's judgment process. A secondary reason was that the cases would otherwise be too complex for the auditors to handle in a reasonable amount of time. The second scope limitation was that the cases were presented only from the standpoint of the auditor's preliminary evaluation and do not reflect results of compliance or account balance testing. This may not represent a serious limitation of the study, for as SAS No. 20 indicates, the auditor can make a materiality evaluation at any of these three points in the audit process.

Organization of the Study

The remainder of the dissertation is divided into four chapters. In Chapter II a review of the pertinent literature is presented, the purposes of which are to 1) identify, define, and synthesize the factors contained in the general materiality concept literature; 2) denote the relationship between the general materiality concept and the specific IACW materiality judgment; and 3) generate the input data for the interview instrument and report the interview results.

Chapter III provides a detailed description of the methodology which was used to answer the research questions posed in this chapter. Chapter III is divided into two sections. The first section presents the methods used for describing the auditor's judgment process and the measures applied in the field experiment. The final section of Chapter III describes the experimental design used in the field experiment. This presentation includes a description of the

experimental variables (dependent, independent and moderating), the experimental tasks and setting, the data analysis procedures and the limitations of the experiment.

In Chapter IV, the results of the field experiment are presented and summarized along the lines of the latter three research questions posed here in Chapter I. The final chapter of the present study, Chapter V, summarizes the overall research effort and findings, particularly with regards to the current implications of the findings and implications for future research.

Notes

[1] This conceptualization of the judgment is equally consistent with Mautz and Sharaf's [1961, p. 47] postulates of auditing which asserts that a good system of IAC "eliminates the probability of irregularities."

[2] SAS No. 20 provides the auditor an option concerning the communication of material IACWs to management. The auditor "should consider" reporting material IACWs to management at interim dates during the audit; however, the auditor can wait until the end of the audit to communicate the material IACWs to management. Nevertheless, the timing of the communication does not affect the discussion presented in this section.

[3] SAS No. 30 [AICPA, 1980] states that the auditor should consider the amount of errors that may occur (defined as a range of zero to the gross amount of assets) and the risk or probability of errors occurring. These factors are not defined precisely (i.e., not operational definitions). Therefore, the auditor may need additional guidance (specific factors to be considered in his judgment) in his evaluation of the materiality of IACWs.

CHAPTER II
MATERIALITY OF INTERNAL ACCOUNTING CONTROL WEAKNESSES: POTENTIAL FACTORS

Introduction

To assess the four specific research questions identified in Chapter I, it is necessary to develop an understanding of the relationship between the concept of materiality and the evaluation of IACWs. The emphasis of this chapter is upon the first research question: what factors are likely to be perceived by the auditor to be important in the IACW materiality judgment? An organized framework for the IACW materiality judgment, derived from the general materiality literature and the IAC evaluation literature, is developed in this chapter. This framework will be used in the identification of a set of factors potentially relevant to the materiality judgment at issue; the factors subsequently will be refined through pre-experiment interviews in order to ensure a representative experimental design.

The literature dealing with materiality discloses numerous factors that auditors may, should, or appear to rely on in various materiality decision settings. The IAC evaluation literature describes IAC objectives and properties and how these objectives and properties relate to the evaluation of an IAC system. These two sources of literature thus provide a basis for deriving, by means of pre-established selection criteria, the preliminary set of materiality factors relevant to the IACW materiality decision.

Factor Criteria

The selection criteria employed were that a selected factor must contain characteristics which are consistent with 1) the AICPA's definitional elements of a material IACW,[1] 2) the current extant literature on how auditors evaluate material IACWs and 3) the specificity required by auditors to make audit judgments and obtain evidential matter. The first criterion is based on the assumption that the auditor is familiar with the profession's definition of a material IACW, and that the factors used in his judgment of the materiality of an IACW are related to the elements contained in the definition. The second criterion simply means that a factor should not be inconsistent with the current literature on how auditors should or do make IACW materiality judgments. Note that under this criterion a factor does not need explicit literature support, but must not be rejected by the current literature. The final criterion is invoked because auditors are likely to consider specific, not general, factors in their evaluation of IACWs. That is, the ". . .auditor must determine whether specific weaknesses exist, [and] the irregularities thereby permitted. . ." and this determination would require the application of factors that relate directly to the IACW and the auditor's evaluation of IAC [Mautz and Mini, 1966, p. 290]. The criterion assumes the auditor provides explicit justification in the audit workpapers for his evaluation of an IACW and considers the ramifications of his evaluation on the rest of the audit.

Chapter Methodology

It is assumed that if factors meet the above criteria, they are likely to be perceived by an auditor as important in his judgment of a

material IACW. The following approach will be taken toward applying these criteria. First, the auditors' approach to the evaluation of IACs is reviewed in considerable detail. The objectives of IAC are reviewed and the properties of IAC that auditors apparently consider important in the evaluation of IAC are identified.[2] This section also considers how the properties and objectives used in the auditor's evaluation of IAC are associated with the materiality of an IACW. The auditor's evaluation of the materiality of an IACW is then briefly discussed.

The concept of materiality is considered in the succeeding section. First, the materiality concept is defined, and then its relationships to financial accounting and to auditing are discussed. This discussion also considers the relationship between financial accounting materiality and auditing materiality, and the relevance of both views of materiality to this study.

In the next section of the chapter a framework for materiality factors is developed. The framework is then used to describe the materiality factors and to derive the factors associated with the IACW materiality judgment which would seem to be important to the auditor. This involves assessing each potential factor identified in the framework, in terms of the three criteria described earlier. The final section of the chapter summarizes the chapter and the conclusions as to the factors that appear potentially important to the IACW materiality judgment are presented. The conclusions are based on the agruments presented within the chapter and on interviews conducted with a small sample of auditors.

Auditors' Evaluation of Internal Accounting Control

As Chapter I indicated, two purposes underlie the auditor's evaluation of IAC. These are:

1) to satisfy the "Second Standard of Fieldwork," and

2) to evaluate a client's IAC system (see SAS No. 1) in terms of the following four objectives of IAC:

i) transactions are properly authorized.

ii) transactions are recorded in a manner such that financial statements may be accurately prepared and all assets may be accounted for properly.

iii) assets are adequately safeguarded.

iv) recording of assets and accountability of assets are verified and differences between what is recorded and what exists are reconciled.

The second purpose is of most relevance to this study since it indicates what auditors would associate with an adequate IAC system. Note, however, that these objectives of IAC are very general and hence the auditor may find it difficult to directly evaluate the extent to which an IAC system has achieved these objectives. Accordingly, the auditor should evaluate specific properties of IAC that indicate whether or not the IAC objectives have been achieved.

Properties of Internal Control

Arens and Loebbecke (A&L [1976]) suggest seven properties that need to be present in an IAC system in order to achieve the above objectives. These properties are:

1) competent, trustworthy personnel with defined responsibilities and authorities;

2) adequate segregation of duties;

3) proper procedures for authorization;

4) adequate documents and records;

5) proper procedures for record keeping;

6) physical control over records and assets; and

7) independent checks on performance.

Since the absence of any one of these properties would imply one or more IACWs, the properties themselves are described in greater detail below.[3]

Personnel. The quality of personnel is a very important property of any system of IAC. It is the responsibility of management to establish an effective IAC environment and the effectiveness of the IAC environment is dependent upon the quality of personnel [AICPA, 1978b, p. 10]. If personnel are incompetent or dishonest, an IAC system can become nonfunctioning [A&L, 1976, p. 161]. Thus, in evaluating internal control, the auditor must consider "...the varying capacities and responsibilities of client personnel involved in the execution of the client's internal control procedures " [Broeker, 1967, p. 77]. This judgment is considered difficult, however, since objective means are not used to evaluate personnel (e.g., the auditor does not administer aptitude tests to employees). The auditor may assess the quality of personnel by evaluating the types of controls used by the company to promote reliability of personnel (e.g., adequate supervision, defined job responsibilities, hiring policies) and may also judge the quality of personnel based upon his experience with their past work, the employees' experience in the job, or by the results of his compliance tests.[4]

Segregation of duties. A strong IAC system requires adequate division of functions or duties, as opposed, for example, to cases

where a single employee should handle all aspects of a transaction. By separating the functions of accounting, authorization, and asset custody, the probability of an error occurring (either intentionally or unintentionally) can be greatly reduced. It is also desirable to have a separation of duties within the accounting function, in order that cross-checks can prevent clerical errors from remaining undetected.

Research by Ashton [1974] has highlighted the importance of segregation of duties. Of the five IAC properties considered within his study, Ashton found segregation of duties to be the primary influence (accounting for 51.4% of the variance) on his subjects' (auditors) evaluative judgments of payroll systems.[5] However, it should be noted that his study concerned one precisely defined system in the IAC area (i.e., payroll) and thus does not necessarily indicate that a lack of segregation of duties always represents a material IACW.[6]

Authorization procedures. All transactions of a firm should have some type of authorization, if IAC is to be considered satisfactory by the auditor [A&L, 1976, p. 163]. Without proper procedures for authorization, a firm's assets would not be properly safeguarded because unauthorized persons could acquire or expend assets. This authorization may be general, as when following prescribed policies of management for a common group of transactions (e.g., set credit limits for customers), or specific if management feels a need to review each individual transaction of a certain type. Finally, the presence of authorization procedures indicates the involvement and commitment of top management to maintaining a strong IAC system. Managements' involvement in the authorization of transactions should be commensurate with the nature and significance of the transaction.

Adequate documents and records. Documents and records of the client provide a major source of audit evidence. They represent the "physical objects" used to transmit information "throughout the client's organization and between organizations" [A&L, 1976, p. 165]. If the documents and records are designed and used properly, the auditor should have reasonable assurance that the assets are controlled and all transactions correctly recorded. Proper design and usage implies that documents and records should be simple enough to understand, multi-purpose, constructed to encourage correct preparation (e.g., blank spaces for approvals), pre-numbered, and prepared on a timely basis [A&L, 1976, p. 165]. If the auditor perceives the documents and records to be adequate, he should reduce his estimate of the likelihood of occurrences of material errors.

Proper procedures for record keeping. Well defined procedures (preferably outlined in procedures manuals) help ensure that all transactions are recorded properly. Proper procedures imply that there are explicit rules concerning the flow of documents throughout the organization, and provide for adequate communication of information to facilitate accurate record keeping and the maintenance of proper control over assets. This property is closely associated with the other properties (in particular, the adequacy of documents and records). It should be noted that a firm can have complex and numerous documents and records, yet little or no control may exist because the absence of defined procedures on how the documents should flow through the system.

Physical control over records and assets. Physical precautions should be taken to ensure the safeguarding of assets and records.

Examples of these precautions or protective measures include inventory storerooms with limited access, fireproof safes for accounting records and currency, and backup records for redevelopment of lost or destroyed records.

Independent checks on performance. The final property to be identified helps to ensure that the expected benefits associated with the previous six properties will be achieved. The integrity of the system over time is enhanced by frequent review of an IAC system in the form of internal checks. An example of a strong internal check is the use of internal auditors who are independent of accounting and operating personnel. The presence of adequate internal checks should enable the auditor to be more confident of the IAC system's ability to detect material errors on a timely basis (given that the other six properties are adequate).

Arens and Loebbecke [1976, p. 161] have stated that the above seven properties are necessary for an adequate IAC system (i.e., a system that achieves the four objectives of IAC). Once the auditor has considered the seven properties in his IAC review, he should then be able to make some preliminary judgments concerning the adequacy of the IAC system. First, if he concludes that the properties are present within the IAC system, the auditor should 1) assume that the IAC objectives have been achieved and that there are no significant IACWs and 2) proceed with compliance tests and development of the rest of his audit procedures. On the other hand, if the auditor determines that one (or more) of the properties of IAC is not present in a client's IAC system, he may be expected to conclude that 1) one or more of the IAC objectives have not been achieved and 2) there are one or more IACWs within the client's IAC system.

The Materiality of Internal Accounting Control Weaknesses

If the auditor evaluates the properties of IAC and has determined that one of the properties of IAC is absent, this implies that the auditor has identified one or more IACWs resulting from the missing controls. After the identification of the specific IACWs, the auditor must consider the types of errors and irregularities that may occur due to the IACWs. Finally, the auditor needs to assess the materiality of the IACWs by evaluating the potential dollar exposure permitted by the IACWs. The auditor's IACW evaluation process is summarized in Figure 2.1.

Decision point 1 was discussed in the preceding section by describing the properties of IAC. The identification of the missing IAC properties by auditors is not considered to be a serious judgment problem. For example, Mautz and Mini [1966] have indicated that:

> . . .the circumstances under which two auditors would disagree as to the presence or absence of weaknesses in a given system of internal control should be rare. Personal standards could undoubtedly affect an auditor's assessment of the seriousness of a given weakness. . .but not his conclusion as to the presence of that weakness.
> [p. 291]

The second decision point, the identification of potential errors and irregularities resulting from the IACWs, has received little attention within the literature. Since most auditing firms have detailed IAC manuals which describe the various errors and irregularities that normally result from IACWs, it is considered that this identification also poses no serious judgment problem for the auditor. It is assumed in this study that auditors can adequately identify the errors and irregularities that may result from IACWs.

Decision Points

1	2	3
Identify Missing Properties of IAC, which implies specific IACWs	Identify potential errors and irregularities resulting from the IACWs	Assess the Materiality of the IACWs by considering:

Evaluate properties of the IAC system

a) probability of the errors and irregularities occurring

b) dollar exposure of the errors and irregularities permitted by the IACWs

FIGURE 2.1

AUDITOR'S EVALUATION OF IACWs

The final decision point is the auditor's assessment of the materiality of the identified IACWs. The auditor should explicitly determine the materiality of the identified IACWs in order to determine how they will affect his audit procedures and to comply with SAS No. 20 [AICPA, 1977]. The materiality of an IACW should be judged by considering the expected dollar exposure due to the IACW. The expected dollar exposure is defined, in a broad sense, as the expected economic loss due to the IACW (this considers both the dollar magnitude and probability of errors permitted by the IACW). This economic loss may be suffered by accounting users', auditors, management or the firm. In this study it is assumed that a material IACW implies a larger potential economic loss, for all the above parties, than an immaterial IACW.[7]

From the above discussion it may appear the auditor's evaluation of the materiality of an IACW is simplistic. However, a direct assessment of the expected dollar exposure by the auditor is not possible. The expected dollar exposure is an expected value; therefore the auditor needs to consider the full probability distribution of the dollar exposure, given the existing facts. This distribution generally is not known to an auditor making an IACW materiality decision. The auditor must rely on surrogate factors related to the expected dollar exposure. The surrogate factors used by the auditor are associated with the probability and the dollar exposure of the errors due to an IACW.[8] Examples of surrogate factors that may be used by the auditor include the most likely amount of dollar errors due to an IACW and the error rate due to an IACW.

In order to have a clear understanding on how the expected dollar
exposure relates to the auditor's materiality judgment the next
section of this chapter considers the concept of materiality.

Concept of Materiality

Definition

The concept of materiality has not been adequately defined by
accountants [Thomas and Krogstad, 1979]. Accountants have
attempted to describe the effects of materiality but have not
developed a genuine definition of the concept. An example of
accountants' descriptions of the concept of materiality is as
follows:

> Materiality commonly is thought of in terms of whether
> the disclosure of a matter or the accounting treatment
> of it is either necessary for a reasonable overall
> understanding of an enterprise's financial statements
> or likely to influence the conduct of a prudent
> investor.
>
> [FASB, 1975, p. 7]

Other writers have offered similar "definitions" of the concept of
materiality.[9]

An important purpose of this chapter is to present a general
definition of the concept of materiality that is applicable to
accounting (i.e., applicable to both financial accounting and to
auditing). The concept of materiality will be defined as

> The perceived importance of a difference between an
> existing state of nature and some other (generally
> a standard or ideal) conceived state of nature.

The above definition has two major components. The first component
is the difference between two states of nature. In accounting
contexts, the existing state of nature represents the expected

dollar exposure given the perceived current set of facts (e.g., expected dollar exposure due to a specific IACW or due to noncompliance with GAAP). The standard state of nature represents the minimum dollar exposure given an ideal accounting information system. An example of an ideal accounting information system is an IAC system which minimizes the probability that significant errors will occur. Such a system presumably minimizes the dollar exposure which can be assumed to be equivalent to a zero (minimum) dollar exposure. Under this assumption the dollar exposure difference between the two states of nature then is equivalent to the expected dollar exposure under the existing state of nature. It is clear, therefore, that assessing the existing state of nature represents a major task for a decision-maker in making a materiality judgment. Since the existing dollar exposure cannot be measured directly, the decision-maker must rely on surrogation.

The second component of the definition is the perceived importance of the difference between the states of nature. This implies that a decision-maker derives some amount of utility (disutility) from the decision that the difference between the two states of nature is important (or not important). This amount of utility (disutility) can be expected to differ between decision-makers since each decision-maker likely will have a different utility function. The decision-maker's utility due to the difference between the two states of nature can be observed only indirectly and after the materiality decision is made (that is, if the decision was that the dollar exposure difference was material, the decision-maker may be presumed to have derived more utility by deciding the difference

was material versus deciding that the difference was immaterial).
An indirect means of describing when the decision-maker will derive
utility or disutility from the dollar exposure difference is to
locate the decision-maker's materiality threshold. The materiality
threshold represents the amount of dollar exposure the decision-
maker is willing to accept beyond his perceived standard state of
nature. Therefore when dollar exposure (or more precisely, sur-
rogates for dollar exposure) differences exceed the materiality
threshold the decision-maker will consider the dollar exposure
material; conversely, if dollar exposure (or a surrogate) is
less than the materiality threshold the decision-maker will con-
sider the dollar exposure immaterial. Note that the materiality
threshold would need to be assessed along the same scale as the
existing state of nature and accordingly, the same type of factors
that relate to the existing state of nature may be expected to
relate to the materiality threshold.

Figure 2.2 presents the above description of the concept of
materiality in diagram form. The definition presented is considered
applicable to materiality judgments in both financial accounting and
auditing contexts. The following example, which is intended to
clarify the definition further, is drawn from a financial accounting
context in view of its ease of understanding and in view of the fact
that the experiment undertaken in the present study will illustrate
the definition's applicability in an auditing context.

A----compare----------→ C ←---compare---------B

$0

Dollar Exposure

Standard or Ideal
State of Nature
(Minimum Dollar Exposure)

Existing State of
Nature (Expected
Dollar Exposure)

the probability distribution
of dollar exposure given the
current state of the world

Dollar Exposure Difference = C

Observable Factors (e.g., dollar
effect) which are relevant to
the assessment of . . . .

Materiality Decision-maker evaluates

establishes a materiality threshold measured
on the same scale as existing state of nature:

1) If materiality threshold is A---then A is less than C which implies
   that the expected dollar exposure is MATERIAL.

2) If materiality threshold is B---then B is greater than C which
   implies that the expected dollar exposure is IMMATERIAL.

FIGURE 2.2

THE CONCEPT OF MATERIALITY

Assume that a company uses the percent of sales method to estimate bad debts. The net value of accounts receivable at year end is $70,000. An aging of the accounts receivable at year end indicates the net receivables should be $65,000. A materiality decision is therefore called for in that the decision-maker (auditor or manager) must determine whether the $5,000 difference should be deemed sufficiently important to require an adjustment of the net accounts receivable. The standard state of nature is the amount considered to be the minimum dollar exposure. It is assumed that the decision-maker perceives minimum dollar exposure (assumed to be equal to zero) to exist when the accounts receivable is valued in accordance with generally accepted accounting principles and where the financial statements are fairly presented. The existing state of nature is the expected dollar exposure (as perceived by the decision-maker) associated with the status quo (i.e., the expected dollar exposure associated with valuing the net receivables at $70,000). The primary problem for the decision-maker is to estimate this expected dollar exposure. The decision-maker needs to 1) estimate the full probability distribution of the dollar exposure associated with stating the net receivables at $70,000, and 2) calculate the expected value of this distribution. The probability distribution, however, is not known to the decision-maker. Therefore the decision-maker must rely on surrogation. A reasonable surrogate for the expected dollar exposure would be the expected dollar effect. The expected dollar effect is the expected value of the probability distribution of the observable dollar differences associated with

the existing state of nature (e.g., the $5,000 difference in this example is one point in the distribution). However, it is unlikely that a decision-maker will assess the full distribution of dollar effects. It may not be cost beneficial for the decision-maker to assess the full distribution (due to the costs of accumulating additional information). Furthermore, several alternative surrogates exist which are assumed to be easier (although they may be suboptimal) for the decision-maker to derive. These include the maximum dollar effect (i.e., the worst possible error permitted by the existing state of nature) or the most likely dollar effect (i.e., the most probable dollar amount of error permitted by the existing state of nature). There is no empirical evidence indicating what surrogates are actually used by decision-makers. However, the FASB [1976] in their interpretation of FASB No. 5, Accounting for Contingencies, considered a similar type of problem. Their problem concerned the estimation of potential losses due to a contingency. The FASB indicated that the decision-maker should choose the most likely amount of loss when accruing for a contingency.[10] Therefore if the decision-maker does not use the full distribution of dollar effects, it is reasonable to assume that he/she will use the most likely dollar effect as an estimate of the expected dollar effect (henceforth to be used interchangeably). In this example the estimate of the expected dollar effect is presumed to be the $5,000 difference. This is because the $65,000 is presumed to be the most likely net receivables as compared to the $70,000 existing state of nature. The probability associated with this estimate may be assessed by considering factors such as 1) the probability that an

additional $5,000 of receivables is uncollectable, or 2) economic

factors that may influence the collectability of the accounts re-

ceivable. It is assumed that a larger expected dollar effect im-

plies a larger existing dollar exposure for any type of materiality

decision-maker.[11] Once the existing dollar exposure is estimated,

the dollar exposure difference between the two states of nature is

derived. The difference is equivalent to the expected existing

dollar exposure since it is assumed that the standard state of nature

is equivalent to zero dollar exposure. The final step for the

decision-maker is to determine the importance of the dollar ex-

posure difference. This presumes that the decision-maker has

conceived a materiality threshold. An example of a materiality

threshold is the dollar amount representing 5% of net income. The

decision-maker then compares the expected dollar effect (the sur-

rogate for expected dollar exposure) to his materiality threshold

(e.g., 5% of net income) and will conclude one of the following:

1) the expected dollar effect (the absolute value)
    is less than the materiality threshold; there-
    fore the writedown of net receivables is un-
    necessary since he perceives that the expected
    dollar exposure is immaterial.

2) the expected dollar effect (the absolute value)
    is greater than the materiality threshold;
    therefore the writedown of net receivables is
    necessary since he perceives that the expected
    dollar exposure is material.

If the first conclusion is made, this implies that the decision-

maker derived a greater amount of utility by valuing the net re-

ceivables at $70,000 and not $65,000, and vice versa if the

second conclusion is made.[12]

In the next section of the chapter it is shown how the concept

of materiality is applied in different accounting contexts and that

the general definition of materiality is applicable to both the

financial accounting context and to the auditing context.

Financial Accounting Materiality Versus Auditing Materiality

The difference between financial accounting and auditing

applications of materiality lies in the type of decisions involved.

Financial accounting materiality decisions are described as

> . . .the materiality decisions which relate to accounting
> matters such as consistency, classification, valuation,
> and disclosure in financial statements. The main concern
> is with the point at which errors and distortions in a
> set of financial statements are serious enough to destroy
> fairness of presentation.
>
> [Leslie, 1977, p. 84]

Auditing materiality decisions, on the other hand, are described as the

> . . .materiality decisions related to planning, executing,
> and evaluating an audit with view to determining the
> extent of audit evidence to be gathered. The main
> concern is with the point at which audit procedures may
> be curtailed and the audit objective considered
> achieved.
>
> [Leslie, 1977, p. 84]

However, both types of decisions involve the same concept of

materiality (i.e., the perceived importance of the difference between

two states of nature) and both have the same ultimate objective.

Figure 2.3 describes the application of the concept of materiality

from a financial accounting context and an auditing context and

shows that both contexts eventually lead to the same objective--

the fair presentation of financial statements.

Financial accounting materiality decisions are directly concerned

Type of Context

Objective

. Financial Accounting
Materiality Decisions
(made by management,
reviewed by auditors) ⎯⎯⎯→ Rely on sound
system of Internal
Accounting Control ⎯⎯⎯→ For making decisions
involving recording,
classifying, adjusting,
disclosing, etc., of
accounting events,
which . . . .

Leads to

FAIR PRESENTATION OF
FINANCIAL STATEMENTS

provide the audit
evidence necessary
for the formation
of an opinion on the

Auditing Materiality
Decisions (made by ⎯⎯⎯⎯→ Includes the assess-
ment of the reliability ⎯⎯→ For the purpose of
developing Audit
auditors) of Internal Accounting Procedures and Tests
Control (through the (at a minimum cost),
preliminary review and which . . .
compliance tests.)

FIGURE 2.3

APPLICATION OF THE CONCEPT OF MATERIALITY TO FINANCIAL ACCOUNTING AND TO AUDITING CONTEXTS

with the fair presentation of financial statements. That is, the
conceived standard state of nature for all financial accounting
materiality decisions is the ideal fair presentation of the
particular accounting event (e.g., transaction, account balance)
involved in the decision.[13] Auditing materiality decisions, on the
other hand, are concerned with audit planning, audit procedures, and
audit evidence. The link between the two is that in order for the
auditor to form an opinion on the fairness of presentation of
financial statements, he needs sufficient audit planning, audit
procedures and audit evidence.[14] Therefore, the auditing materiality
decisions ultimately have the same objective as financial accounting
materiality decisions, as Thomas and Krogstad [1979, p. 77] have
pointed out:

> Remember that materiality decisions related to internal
> control deficiencies, audit procedures and sufficiency
> of evidence underlie the ultimate materiality decision
> regarding the fairness of presentation.

Most academic materiality studies have focused upon financial
accounting materiality (e.g., Woolsey [1954a; 1954b; 1973b];
Boatsman and Robertson [1974]; Newton [1977]). The important factors
associated with financial accounting materiality decisions have
received considerable attention in the materiality literature (see
FASB [1975]). Given the relationship between auditing materiality
and financial accounting materiality it is reasonable to expect that
factors considered important in financial accounting materiality
decisions will be closely related to factors that auditors consider
important in auditing materiality decisions. In fact, the sole
empirical auditing materiality study [Moriarity and Barron, 1979] used
several factors that were also assumed to be relevant in financial

accounting materiality decisions. Hence, the materiality literature as a whole must be considered relevant in a search for important factors in the judgment of material IACWs.

The Internal Accounting Control Weakness Materiality Decision

The materiality decision concerning an IACW is an audit materiality decision. The evaluation of IAC and the identification of material IACWs should influence the type and quantity of evidence that is collected in performing an audit (see Chapter I and Figure 2.3). Of course, materiality decisions relating to IACWs may involve factors that are more abstract or subjective than factors associated with financial accounting materiality. Carmichael [1970] states:

> Weaknesses in internal control can have a potential material impact on operations, but their materiality cannot be evaluated in the same manner that a known dollar amount of error can be with respect to the financial statements taken as a whole.
>
> [p. 49]

Nevertheless, IACW materiality decisions are concerned with the same concept of materiality relevant to all materiality decisions. That is, IACW materiality decisions are made by considering the importance of the difference between a perceived standard state of nature and the perceived existing state of nature. Therefore, a reasonable starting point in identifying the important factors relevant to an IACW materiality decision is to review the literature pertaining to the financial concept of materiality.

Categorization of Materiality Factors

Existing research dealing with the concept of materiality is both normative and empirical, with primary emphasis being placed upon financial accounting materiality decisions. A multitude of factors

have been mentioned in this literature as having a potential impact on materiality decisions made by auditors.

A useful summary and discussion of the majority of the materiality literature were presented by the FASB in FASB Discussion Memorandum: An Analysis of Issues Related to the Criteria for Determining Materiality [FASB, 1975]. The FASB prepared this Discussion Memorandum based upon interviews with auditors and other interested parties and upon an extensive review of the materiality literature. The FASB's Discussion Memorandum was primarily concerned with financial accounting materiality and the factors that affect financial accounting materiality decisions. The Discussion Memorandum did not include the relationship of the factors to auditing materiality decisions. Thomas and Krogstad [1979] state: "The FASB's DM should help the profession move toward a definition of materiality in an accounting sense, but many of the auditing dimensions of the concept are not considered " [p. 74]. However, one aspect of the FASB's Discussion Memorandum that may be applied to various types of materiality decisions was the FASB's categorization of potential materiality factors into several general factors. This categorization both shows the multidimensionality of the materiality concept and helps sort specific factors into a workable framework [Thomas and Krogstad, 1979, pp. 75-76]. The FASB suggested seven general factors which may be considered by an auditor in a materiality decision. These factors are:

1) Environmental---economic, business practices

2) Enterprise related---management, risk, etc...

3) Accounting policies

4) Uncertainty of the existing state of nature

5) Surrounding circumstances associated with the existing state of nature

6) Magnitude and financial effect

7) Aggregation effects

The last factor category suggested by the FASB, aggregation effects, will not be considered a factor category for this framework. An example of an aggregation effect is:

> An auditor discovers two errors in the accounts of a client, where the first error overstates net income by $10,000 and the second error understates net income by $6,000. The auditor determines that the first error is material, whereas the second error is not material. If the auditor aggregates the two errors he does not consider the net effect to be material. The alternatives for the auditor are: 1) to require the client to correct the first error, or 2) to not require any adjustment by the client. If the auditor chooses alternative one, he then judges each materiality event individually; whereas, if the auditor chooses alternative two, he accumulates or offsets several materiality events in order to make a single materiality judgment.

As the example shows, aggregation effects are not a set of factors that determine materiality per se, but it reflects how the auditor accumulates or offsets several materiality decisions. Since this study is interested in how auditors evaluate materiality for individual IACWs (i.e., one materiality decision at a time) and not how auditors evaluate materiality for a group of IACWs, aggregation effects will not be considered further.

The resulting six general factor categories provide a framework of organization within which specific factors may be defined and described as necessary. Table 2.1 identifies the specific factors (as identified in the literature) grouped within the general factor categories and cross references the specific factors to the literature. The next section of this chapter utilizes this framework in describing specific

TABLE 2.1

A SUMMARY OF RESEARCH ON THE FACTORS WHICH AFFECT MATERIALITY JUDGMENTS

Individuals and Groups publishing studies related to materiality
factors (See last page of table for reference of Author(s) to No.)
Factors of Materiality by General Categories (for Explanation of
Symbols----see last page of table)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Environmental:																				
Economic Indicators--																				
money supply					0															
GNP																		a		
interest rates																				
miscellaneous, others																				
Political--																				
international					0															
government contracts (area of spending)																				
budgets																				
local, regional, and national policies																				
taxes																				
Business Practices--					0															
regulation																				
ethics																				
industry control																				
Enterprise Related																				
Quality of Management and Personnel--					0															
motives																				
credibility																				
competence																				
Business Risk--					0															
policies of management																				
experience of firm																				
financial stability and leverage																				
volatility (common stock, etc.)																				
Enterprise Operating Characteristics--																				
competition																				
demand and supply of services					0															
Type of Firm--					0															
size of firm					0													0		
public vs. private																				
Cost/Benefit--																				0
direct costs																				
indirect costs																				
benefits																				

Table 2.1--continued.

Individuals and Groups publishing studies related to materiality factors (See last Page of table for reference of Author(s) to No.
Factors of Materiality by General Categories (For Explanation of Symbols--- see last page of table)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Accounting Policies:																				
Public Image of Firm			O															O	O	
Conformity with GAAP		O		O										*	O					
Consistency				O																
Liberal vs. Conservatism																				
Discretionary vs. Non-discretionary change																				
Management Motives																				
Future Effect																				
Uncertainty:												O								
Experience with matter					O															
Familiarity with matter																				
Probability of Occurrence (amount and timing)																				
Risk																				
Surrounding Circumstances associated with the Existing State of nature:					O									*	O					*
Unusual nature and frequency of item		O		O	O															*
Voluntary or Involuntary decision		*		O	O	@		*	*	*			@*	*	C				*	O
Time effect of matter (temporary or permanent)				O	*									*						
Sensitivity of transaction (e.g., effect on earnings trend)		@		O	O	@	*	@*	*	*	@		@*	*	O*@					@*
Type of Judgment Item		@*			O	@*		*	O				@*		O					@
Dollar Effects:																				
Absolute dollar size		*	O	O	O	*		*	*					O	O			O	O	*
Relative dollar effect to--																				
current net income				O	@		@*													
normal net income				O	O	@*	*	@												
earnings per share				O	@															
gross profit				O	O	*	@													
other relevant accounts		O		O	O*	*	*	@*	*	*			*	C						*
Liquidity and solvency effects--																				
working capital				O	@															
current ratio				O	O	@							O	O					O	
debt equity				O	O								O	O	O					
type of account				O	O*	@	*	*					O	O						*
other financial ratios				O	O										O					

Table 2.1--continued.

REFERENCE OF AUTHOR(S) TO THE NUMBER ASSIGNED TO THE STUDY

1--Beaver, W. H. [1978]

2 - Bernstein, L. A. [1967]

3- Beatreman, L.R. and Robertson, L. [1974]

4- Copeland and Fredericks [1968]

5- FASB, Discussion Memorandum [1975]

6--Frishkoff, P. [1970]

7--Hicks, I. L. [1962, 1964]

8--Hofstedt, T.R. and Hughes, D.G. [1977]

9--Messier, W.F. Jr. [1979]

10--Moriarity, S. and Barton, E.H. [1976 and 1979]

11--Bowman, E. [1968]

12--Bowman, L.R. [1977]

13--O'Connor, H.C. and Collins, D.W. [1974]

14--Pattillo, J.W. [1975]

15--Reininga, W. [1968]

16--Rose, J., et.al. [1970]

17--Stringer, K. [1970]

18--Thomas, W. and Krogstad, L. [1979]

19--Ward, B.H. [1976]

20--Woolsey, S.M. [1956a&b, 1973a&b]

EXPLANATION OF SYMBOLS USED IN TABLE

d The author suggests the use of this factor
   for materiality decisions

s The author found this factor being used by
   subjects of his study (for materiality decisions)

O The author points out the use of this factor by
   other authors or by subjects of other authors'
   research, but does not necessarily agree with
   this suggestion (non-committal)

factors, identifying the literature in which the various factors have
been cited and applying the criteria for factor selection.

Materiality Factor Description and Application
of the Factor Selection Criteria

The objective underlying the selection criteria is to derive the

factors which are associated with the IACW materiality judgment and

which are likely to be significant to the auditor. It will be re-

called that the selection criteria (introduced and defined in the

beginning of this chapter) for the factors are:

1) The selected factors should be consistent with the
definitional elements of a material IACW. The
definition of a material IACW includes two elements.
These elements are the probability and the dollar
exposure indicated by an IACW. Therefore a factor
needs either to be relevant in estimating the
probability of an error (or irregularity) occurring
due to a specific IACW or to be a surrogate for
estimating the dollar exposure of the errors
permitted by the IACW.

2) The selected factors should not be inconsistent with
the current literature on how auditors should or do
evaluate material IACWs.

3) The selected factors should be accessible to the
auditor and should be specific enough to relate to
an individual IACW. This means that the relation-
ship between the factor and the properties of an
IAC system should be clear, allowing the auditor
to assess the impact of the weakness.

Environmental Factors

Description. The environmental factors describe the external

environment in which a business firm must operate. The external

environment can be described in terms of political events, economic

events and business practice events. Environmental factors generally

are uncontrollable by the firm. The auditor should apply these

factors to his materiality judgments by determining how a specific environmental event will affect the normal operations of a business firm [FASB, 1975, p. 70]. Some specific factors the auditor may consider are the broad range of economic indicators (e.g., money supply, interest rates), whether or not a company is regulated, and government spending patterns. A specific example of an environmental factor that could affect an auditor's materiality decision would be a government decision to cut defense spending significantly (a political event) when the auditor's client depends largely on defense contracts as a source of business. If the future of this company as a going concern may be threatened, some form of disclosure may be deemed necessary. This situation raises two materiality related questions--- Is the effect of the political event on the client material enough that the auditor should qualify his audit opinion or at least require some form of disclosure?

It has been advocated that auditors should apply the environmental factors in making their materiality judgments. FASB [1975] and Thomas and Krogstad [1979] for example, both indicate that auditors should consider the environmental factors when setting their materiality guidelines for individual clients.

Criteria application. The environmental factors satisfy the first and second criteria. However, they fail to meet the third criterion. The environmental factors are too general for an auditor to apply to any materiality judgment of a specific IACW. In financial accounting materiality studies these factors either have been ignored or have been held constant.[15] Presumably, the researchers considered that these factors could not be directly related to the individual materiality

decisions examined. It is also difficult to imagine how any of these factors would have a direct relationship with the objectives or the properties of IAC.

Enterprise Related Factors

Description. The enterprise related factors are those factors which describe the business. Most of these factors are qualitative in nature, with no objective rules available for their measurement. Specific factors included within this category are:

Quality of management and personnel---this includes managements' motives and credibility as well as the competence of all employees. With regard to motives and credibility an auditor could classify these factors only along a favorable-unfavorable dimension; in any materiality decision then, the auditor should assess the relationship of these qualities to the existing state of nature. With regard to competence, the auditor may evaluate the experience of the personnel in their jobs and his past relations with them; given inexperienced personnel, the auditor should increase the probability of dollar exposure occurring. The use of the quality of management and personnel factors in materiality decisions has been recommended by several authors (e.g., FASB [1975] and Messier [1979]), and Pattillo [1975] reported survey results that indicated these factors do affect auditor's financial accounting materiality decisions.

Business Risk---Business risk is defined as the exposure to financial loss due to specific characteristics of the enterprise. Examples of such characteristics are policies of management (e.g., credit policy) and legal liability history. Indicators of business

risk for a particular firm may be measured quantitatively or quali-
tatively. An example of a quantitative measure of business risk is
"beta" (common stock volatility). An example of a qualitative measure
of business risk is to presume that newer firms have higher risk than
established firms. In their financial accounting materiality study,
Boatsman and Robertson [1974] found that the business risk factor
(measured by common stock volatility) was a statistically significant
factor in disclosure decisions by a group of auditors. However, the
risk factor explained only 2% of the variance in auditors' disclosure
decisions.

Enterprise operating characteristics---specific factors
included in this category are the level of competition associated
with the firms' products, the economic characteristics of the firms'
products (e.g., price elasticity), and the financial structure of a
firm. It is difficult to identify a specific group of materiality
decisions within which enterprise operating characteristics would be
considered, but it is conceivable that they would influence the
auditor in a specific materiality decision (e.g., decisions relating
to disclosure of anti-trust suits or of threats to the going concern
status of the firm).

Type of firm---this includes the size of the firm and whether
it is a private or public company. The size of the firm is one factor
that can be quantitatively assessed (although there may be disagreement
as to the appropriateness of the particular measure of size). In
Frishkoff's study [1970], size of the firm was measured as the dollar
magnitude of stockholder's equity. Frishkoff found size of the firm
to be a significant factor in materiality decisions concerning changes

in accounting methods. However, his sample size of large firms was small, and thus the true significance of the size factor may be questionable (see Stringer [1970]). The other type of firm factor, private vs. public ownership, has not been empirically examined in a materiality decision context, but examples of the effect of this factor on materiality decisions may be offered. For example, public companies have formal rules and regulations to follow (e.g., SEC regulations), that include rules governing certain materiality decisions (e.g., materiality judgments relating to capitalization of leases, disclosure of leases, reporting of replacement data), yet private firms may not be bound by those rules. Thus, a private firm may make a different materiality judgment than a public firm even if the circumstances associated with the judgment are identical.

Cost/Benefit considerations---simply described, these factors are the costs (indirect and direct) and benefits that accrue to the enterprise and stockholders because of materiality decisions. For example disclosure of a piece of information may be desirable, but the cost to gather the information may be considered excessive. The benefits related to the materiality decision are said to be "difficult to measure" and in some cases are ignored [FASB, 1975; AICPA, 1978b]. The costs in this decision may include:

> . . .and direct incremental costs such as the cost of gathering and reporting additional information, any indirect costs such as increased liability exposure and legal fees, and any competitive implications.
> [FASB, 1975, p. 75]

As the above shows, this factor overlaps with other enterprise related factors (e.g., enterprise operating characteristics), but differs in terms of explicit quantitative (dollar value) considerations. Beaver

[1978] has advocated the use of cost/benefit factors for making dis-

closure type materiality decisions. Ward [1976] investigated auditor's

perceptions of the relative importance of materiality related factors,

and included two cost type factors in his study: 1) losses suffered by

stockholders and clients due to an incorrect materiality decision by

the auditor, and 2) losses by the client and stockholders due to

lawsuits or court action. Neither of these factors was significant in

the auditors materiality judgments. These results could be due to the

fact that auditors recognize the difficulty in measuring cost/benefit

considerations, and thus consider them impractical and unimportant to

materiality decisions.

Firm's image---this relates to the credibility of the enterprise

among the financial community and the public in general. An example of

this is potential embarrassment to the firm from the discovery of an

error subsequent to the issuance of the financial statements, where

hindsight indicates the error is material. Another example occurs

when a firm makes disclosures, that are not necessary for the fair

presentation of financial statements, in order to draw favorable

praise from the financial community. Reininga [1968] indicated

auditors should consider this in a materiality decision, but the

auditors in the study by Ward [1976] considered this factor to be

insignificant to their materiality decisions.

Criteria application. The first enterprise related factor

concerns the quality of management and personnel. This factor does

satisfy all three selection criteria, for the auditor's evaluation

of personnel in an IAC area where a weakness is located should have an

impact on his materiality judgment. With regard to the first criterion,

the quality of management and personnel can provide an indication of the probability of material errors occurring due to an IACW. The following scenario illustrates how the quality of personnel can affect the auditor's probability judgment:

> A company has only one employee to receive and to record cash receipts. This would definitely be an IACW because of a lack of segregation of duties. However, if the auditor judges that the employee is extremely competent and honest, he may discount the seriousness of this weakness due to a smaller likelihood of a material error occurring.

Hence, this factor satisfies the first criterion since it can be relevant to estimating the probability of the errors due to a specific IACW.

In reference to the second criterion, no explicit literature reference indicates that the auditor does not need to judge the quality of personnel in his evaluation of the materiality of an IACW. Therefore, this factor is not inconsistent with the second criterion.

Although it may be difficult for the auditor to apply the quality of management and personnel factor to a specific IACW, this factor satisfies the third criterion. The auditor may judge the quality of personnel by the experience he has had in working with the personnel or by judging the experience of the personnel in a particular type of job. However, there is no hard evidence that the auditor can use to make this judgment. The quality of personnel factor is directly related to the personnel property of a strong IAC system and therefore is directly related to the auditor's evaluation of IACWs.

The second enterprise related factor discussed was business risk. The risk factor does satisfy the three selection criteria. In the IACW materiality judgment the risk factor should be evaluated by determining the type of exposure that is a consequence of the IACW.

The risk factor satisfies the first criterion because it may be relevant to estimating the probability of an error occurring due to an IACW. An IACW in an area of high business exposure (i.e., high risk) may indicate a higher probability of errors occurring.

The risk factor also satisfies the second criterion. According to Fisher [1978] business risks need to be analyzed (ranked from high risk to low risk) in the development and evaluation of IAC systems. If a serious IACW is present within a high risk area, IAC objectives may not have been attained and management would need additional controls in that area to prevent material errors [Fisher, 1978, p. 359]. Martin and Johnson [1978] also refer to business exposure (i.e., risk) as a guideline in evaluating the materiality of IACWs.

The risk factor does meet the conditions of the third criterion. Martin and Johnson [1978] relate the risk factor to the evaluation of the materiality of an IACW by considering the nature of the items (assets or type of transactions) that may be affected by the IACW. That is, where an IACW exists in an area that is highly susceptible to fraudulent conversion (e.g., cash as opposed to fixed assets), the probability of a material error occurring is increased. The auditor should also consider the nature of the item in evaluating IAC objectives and properties as they apply to that particular IAC area [Ernst and Ernst, 1978a].

Type of firm is the next enterprise related factor that meets the criteria for factor selection. The size of the firm, in particular, may affect the auditor's IACW materiality judgment. With regard to the first criterion, it can reasonably be argued that the larger the firm the lower the probability that material errors will occur due to an

IACW, since larger firms should have greater resources to devote to establishing IACs. This may be especially true when it comes to IACWs involving separation of duties. It is generally more feasible for a larger firm to provide for adequate segregation than for a smaller firm to do so. Furthermore, where a small firm and a large firm have the same IACW, it is more probable that the large firm will have another IAC that will either partially or fully compensate (offset) for the specific IACW.

With respect to the second criterion, the literature on how auditors evaluate the materiality of IACWs provides no indication that auditors should not consider the size factor in their IACW materiality judgment. Hence, this factor is not inconsistent with the second criterion.

The size factor also satisfies the third criterion of factor selection. The size factor is also directly related to the IAC properties and to the IAC objectives evaluated by the auditor. A small firm will likely find it more difficult to achieve all the IAC properties of a strong IAC system (e.g., achieving adequate segregation of duties). Nevertheless, the IAC objectives are equally important to a small firm, and the auditor should still evaluate any IACW as to its effect on achieving the IAC objectives.

The cost/benefit factor is the final enterprise related factor that satisfies all three criteria for factor selection. Simply put, the factor implies that the aggregate cost of correcting the IACW should not exceed the benefit to be derived, if the IACW is to be considered material. This does not mean, however, that an IACW is necessarily material if it is cost beneficial to correct. Fisher [1978]

supports this statement by pointing out that a firm has a limited amount of resources to spend on IACs. A firm may have an IACW that is cost beneficial to correct, but the correction would not reduce the firm's exposure significantly enough to use the firm's resources to correct the weakness. In short, a necessary but not sufficient condition for a material IACW would be that it is cost beneficial to correct. Since the cost/benefit factor is relevant to estimating the dollar exposure from an IACW, it satisfies the first criterion.

The cost/benefit factor satisfies the second criterion since the current literature [Fisher, 1978; AICPA, 1978b; Ernst & Ernst 1978a] includes advocacy of the use of a cost/benefit analysis in the evaluation of IACs and IACWs. The cost/benefit analysis has been discussed in its relationship with audit evidence and the concept of reasonable assurance [AICPA, 1978b]. That is, in the evaluation of the materiality of an IACW, the auditor should obtain evidence that provides reasonable assurance as to the achievement of the IAC objectives. It follows that the auditor also should have reasonable assurance that an IACW is or is not material. Reasonable assurance is obtained by applying a cost/benefit analysis. The discussion of cost benefit analysis and materiality presented within the AIPCA committee report on IAC [AICPA, 1978b] included the assertion that

> Measuring the cost-benefit relationship is an important subject for research. For the present, final decisions relative to an evaluation of internal accounting control requirements in areas where exposure could be material should be carefully reviewed and approved by appropriate levels of management.
> . . .there is generally some materiality limit below which it may be impractical to institute control procedures and techniques. These limitations should be considered when management analyzes the cost-benefit relationship between a control procedure and the benefits expected to be derived. [p. 15]

From the above it may be concluded that auditors should review managements' cost/benefit analysis in their evaluation of the materiality of an IACW, but that it may be difficult for management to provide such an analysis. Nevertheless, the cost/benefit factor does satisfy the third criterion since 1) the factor should be considered in evaluating the necessity of instituting an IAC for correcting a specific weakness, and 2) in applying a cost/benefit analysis to the materiality of an IACW, the auditor should include the effects of the weakness on IAC properties and objectives.

The two remaining enterprise related factors, enterprise operating characteristics and firm's image, do not meet the criteria for factor selection. Neither of these factors can be used to estimate the probability effects or dollar exposure associated with errors due to an IACW. Neither factor, being unrelated to the IAC objectives or to the IAC properties, is significant to materiality decisions concerning specific IACWs.

Accounting Policy Related Factors

Description. These are the factors that are relevant to the application of generally accepted accounting principles (GAAP). Some materiality decisions may deal with a known error in applying GAAP; a management choice in applying alternative GAAP or an inconsistent application of GAAP over time. They directly concern the auditor's opinion of the company's financial statements (i.e., an opinion as to the fair application of GAAP on a consistent basis), and hence a stricter materiality judgment would normally be required (i.e., the auditor should lower his materiality threshold---[FASB, 1975]). The

judgment may consider specific circumstances associated with the
application of GAAP; for example, whether it is a liberal or a
conservative use of accounting principles, whether it is a dis-
cretionary or nondiscretionary change in accounting principles,
the nature of the management motives behind the transactions (e.g.,
to "manage" earnings), the extent of likely misstatement over
future periods [FASB, 1975, pp. 76-78], and so on.

In his search for important factors in the materiality judgment,
Pattillo [1975] considered materiality decisions involving accounting
policy changes and disclosure of accounting policies. He found that
auditors lowered their materiality threshold in materiality decisions
concerning unusual accounting policies; however, the dominant factors
in these decisions were the percent effect on net income and impact
on earnings per share. Boatsman and Robertson [1974] also included
accounting changes as a factor in their materiality policy-capturing
study; they concluded that accounting changes were an insignificant
factor since they explained less than 1% of the variance in the
specific judgments examined.

Criteria application. The accounting policy related factors do
not satisfy the criteria for factor selection. Accounting policy
related factors are only indirectly related to IACW materiality
decisions. These factors pertain to how the firm uses accounting
policies and not to the IAC system used in implementing the policies.
IACWs would involve accounting policies only to the extent that the
firm's IAC systems failed to properly record or to properly value
a certain transaction in conformity with GAAP. Although this is

important, the IACW would still exist under any accounting policy the firm may use. In addition, there is no reason to believe that the use of one accounting policy versus an alternative accounting policy would influence the probability or dollar exposure of errors due to an IACW.

Uncertainty of the Existing State of Nature

Description. Many materiality decisions involve estimating future effects and thus require consideration of the uncertainty factor. The FASB [1975] "defined" the uncertainty factor in terms of the auditor's ability to assess the future effects related to a materiality judgment. The FASB stated that in the evaluation of uncertainty the auditor should:

> . . .seek to assess the probability of the occurrence of a future event and of the amount and timing of its potential financial effect. Experience and familiarity with the type of matter involved, imminence of occurrence and risk to the enterprise are all factors which would be considered in any given situation.
> [p. 78]

Given the materiality definition used in this study, the uncertainty factor refers to the uncertainty associated with the auditor's perception of the existing state of nature. The uncertainty factor is concerned with the likelihood that the expected dollar exposure will be a significant amount. The more certain the perception of the significance of the existing state of nature, the less risk the auditor presumably will be willing to take. Thus if the auditor is certain the expected dollar exposure will be significant, then the auditor will likely attempt to minimize the amount of his dollar exposure, and will likely reduce his materiality threshold. The FASB [1975], in fact, has stated that auditors actually do apply a lower

materiality threshold to materiality decisions involving less un-
certainty. Newton [1977] included the uncertainty factor in a
materiality study concerning auditors' risk behavior and their
materiality threshold. The results of her study, however, were
inconclusive.[16]

Criteria application. The uncertainty factor satisfies the three
selection criteria. Since the uncertainty factor relates to the
probability of errors occurring due to an IACW, it does satisfy the
first criterion of factor selection. Operationalization of the un-
certainty factor, however, poses a significant problem for the auditor.
The assessment of the uncertainty associated with an IACW must be
subjective, as implied by the suggestion that the auditor personalize
the uncertainty evaluation [FASB, 1975]. The auditor's estimate of the
uncertainty of an IACW, therefore, depends upon his/her experience and
familiarity with that type of IACW and the errors associated with such
an IACW.

A measure the auditor may use to determine the frequency of
errors due to an IACW is the potential error rate. The use of the
potential error rate in the IACW materiality judgment has been
advocated by several authors [Martin and Johnson, 1978; Fisher, 1978;
AICPA, 1978b]; therefore this factor satisfies the second criterion.
The potential error rate may be based on historical error rates in-
curred by the firm or on the perceptions of firm's personnel
[Martin and Johnson, 1978]. The use of the potential error rate as a
measurement of the uncertainty factor would also satisfy the third
criterion of factor selection. Error rates may be estimated for each

IACW identified by the auditor. The error rate is also related to IAC objectives since higher error rates increase the probability that the objectives of IAC will not be achieved [Fisher, 1978].

Surrounding Circumstances Associated with the Existing State of Nature

Description. In making a materiality decision, the auditor should consider the surrounding circumstances associated with the existing state of nature. There are five factors that may be pertinent to this evaluation.

The first factor is whether or not the circumstances associated with the existing state of nature are unusual and/or infrequent for that particular company. Pattillo [1975] reported that if the materiality decision involved circumstances that were unusual or infrequent for that business or the industry, the auditor would lower his materiality threshold.

The second factor is whether or not the action by management that led to the existing state of nature was voluntary or involuntary. Voluntary actions likely will be associated with more careful review by auditors and with a lowering of the auditors' materiality threshold [FASB, 1975].

The third factor is whether or not the circumstances associated with the existing state of nature are permanent or temporary. Permanent conditions should be considered more significant by the auditor since they will recur in the future.

The fourth factor is the sensitivity of the circumstances associated with the existing state of nature. Several authors (e.g., Hicks [1964]; Reininga [1968]; FASB [1975]) have indicated that

auditors should lower their materiality thresholds under sensitive circumstances. Examples of sensitive circumstances are where materiality decisions relate to non-arms-length transactions and where decisions may cause a change in the earnings trend (e.g., positive to negative trend). A few studies have examined whether auditors do lower their thresholds in these situations (e.g., Woolsey [1954a] and Pattillo [1976]). In Frishkoff's study [1970] and Boatsman and Robertson [1974], earnings trend was essentially insignificant in the auditor's materiality decision. Also Moriarity and Barron [1976] and Messier [1979] found that the relative importance of earnings trend, as compared to the percent effect of net income, was weighted substantially less by auditors in their materiality decisions. However, for a small number of individual auditors in these studies, the earnings trend was considered to be the most important factor in their materiality judgments.

The final factor is the type of circumstances associated with the existing state of nature. In a sense this is a catch-all factor covering circumstances not included in the above factors. Examples include 1) the relationship of the circumstances to the liquidity position of the firm (i.e., does it involve cash, working capital, fixed assets?), and 2) the type of accounting transaction involved (e.g., a reclassification entry, contingency, gains and losses on fixed assets). From the results of empirical studies (e.g., Frishkoff [1970] and Pattillo [1975]), it appears that these factors affect materiality decisions, but are not the primary factors used in the decision. Frishkoff [1970] found that the type of accounting transaction involved was a significant factor in explaining

materiality decisions concerning auditor's qualified opinions.
Boatsman and Robertson [1974] found that in materiality judgments
relating to disclosure of gains or losses on sales of non-current
assets, changes in accounting principles or contingencies, the type
of accounting transaction was a significant factor in explaining
auditors' judgments. Woolsey [1954b] found that in materiality
decisions concerning contingencies, the auditor would increase his
materiality threshold and would evaluate the effect of the con-
tingency on the liquidity position of the firm (e.g., working capital).
In the experiment by Ward [1976], auditors agreed that liquidity
effects were an important materiality factor in financial accounting
materiality decisions. Finally, Pattillo [1975] examined several
types of judgment items in materiality decisions and concluded that
the auditor would probably decrease his materiality threshold if the
effect of the judgment item were unfavorable to the client. This is
probably due to a conservative attitude on the part of the auditor.

Criteria application. The first four factors described in this
category (frequency of materiality judgment item, management control,
lasting nature of materiality judgment item and sensitivity of the
materiality judgment item) fail to satisfy the criteria for factor
selection or are repetitive of previous IACW materiality factors.
The following indicates the reasons for this failure:

1) The auditor may consider an IACW to be unusual or
   infrequent for a particular type of firm, but
   knowing this does not give any indication of the
   probability of errors due to the IACW or of the
   dollar exposure of the errors permitted by the IACW.
   Therefore, this factor does not satisfy the first
   criterion.

2) The existence of an IACW is a voluntary action by management. That is, management always has control of whether or not they have an IACW within their IAC system. Therefore, management control would not help discriminate between material and immaterial IACWs.

3) The lasting condition of the IACW (i.e., the degree of permanence of the effects of the IACW) should be considered by the auditor in his evaluation of the uncertainty factor. Therefore, the lasting condition of an IACW should have been already accounted for in the uncertainty evaluation in an auditor's IACW materiality decision (see page 61).

4) The auditor may consider an IACW to be sensitive (e.g., allows for a non-arms-length transaction to occur), but this knowledge gives no indication of the probability of errors due to the IACW or of the dollar exposure of the errors permitted by the IACW. Therefore, this factor does not satisfy the first criterion.

The final factor in this category, type of judgment item, does satisfy the criteria for factor selection and is assumed to be potentially important to the IACW materiality judgment.[17] This factor is the type of IAC that is affected by an IACW. The two types of IACs are basic and disciplinary controls [Martin and Johnson, 1978]. Basic controls (procedural or clerical controls) are the elementary techniques necessary for an IAC system and are intended to provide assurances that the transaction flows are valid, complete and clerically accurate. The basic controls are mechanical and clerical procedures used in an IAC system. Examples of these controls are authorization and approval of purchase orders, double checking, or reconciliations. Disciplinary controls represent the operationalization of the properties of a strong IAC system and provide assurance that the basic controls are operating continuously. These controls are the foundation of a firm's IAC system. Examples of disciplinary controls

include adequate segregation of duties, proper supervision, limited access to assets and an internal audit staff.

Type of IAC affected by the IACW satisfies the first criterion for factor selection because it is relevant to estimating the probability of an error due to an IACW. If the IACW affects a disciplinary control rather than a basic control, a higher probability should exist that the IACW will lead to material errors. The primary reason is that a lack of a disciplinary control provides a direct indication that the properties of a strong IAC system have not been maintained; on the other hand, a lack of a basic control does not always indicate an IACW. A firm may have various combinations of basic controls that provide for a satisfactory IAC system, and thus, the absence of a particular basic control does not necessarily imply an IACW [Defliese, Johnson and McLeod, 1977]. This factor also meets the second criterion and, in fact, its applicability to the IACW materiality decision has been suggested by Martin and Johnson [1978]. Ashton [1974] found a lack of segregation of duties, an effect on a disciplinary control, to be the most significant factor in explaining the auditor's evaluation of an IAC system. Finally, the third criterion is satisfied because this factor is directly concerned with IAC properties and the effects of a specific IACW on the presence of those properties.

Dollar Effects

Description. In order for an auditor to make any materiality decision, some dollar approximation of the existing state of nature generally is required before he evaluates materiality. A surrogate

factor for this approximation is the dollar effect. The dollar effect
is some observable dollar amount associated with the existing state of
nature (e.g., a $5,000 writedown of inventory). Dollar effects have
been the dominating factors suggested in the literature. The dollar
effect can be evaluated by the auditor in one of two ways: 1) in
terms of an absolute dollar magnitude, or 2) in terms of a relative
dollar magnitude (e.g., the percentage relationship between the
dollar effect and current net income before taxes).

Woolsey [1954a, 1954b] and Frishkoff [1970] included absolute
dollar magnitude of the materiality decisions in their studies, and
both reported that auditors do not consider the absolute magnitude
to be significant. Boatsman and Robertson [1974] and Hofstedt and
Hughes [1977] also included absolute magnitude factors in their
experiments, and found them to be statistically significant (although
not dominant factors) in the judgment models of the auditors. The
FASB [1975] and Pattillo [1975] suggested that absolute magnitude
factors should be important in materiality decisions when 1) the
business has a net loss or is near breakeven, 2) the materiality
judgment has a potential future effect, or 3) the materiality
judgment involves a sensitive situation.

The relative dollar magnitude factor has also received con-
siderable attention in the literature. Hicks [1962, p. 64] has
asserted that the auditor's judgment of "materiality normally turns
upon the relation between the amount of the item in question and the
amount of some appropriate basis for comparison. . . ." Research
indicates that the relation of dollar effect to current net income
is an important factor in materiality judgments [Woolsey, 1954a and

1954b; Frishkoff, 1970; Boatsman and Robertson, 1974; Pattillo, 1975; Moriarity and Barron, 1976; Ward, 1976, and Messier, 1979]. The study by Neumann [1968] found a lack of consensus among auditors on how to apply the relationship of dollar effect to current net income. Pattillo [1976], Bernstein [1967], and Woolsey [1954a] reported similar findings in their studies. Other researchers have considered the possibility that auditors may try to judge the materiality of the dollar effect in relation to average income [Bernstein, 1967], operating profit (a significant factor in Hofstedt and Hughes [1977]) or gross profit [Canadian Institute of Chartered Accountants, 1972]. Pattillo [1976] and Boatsman and Robertson [1974] examined the relationships of other income statement items (e.g., sales, expenses) to the dollar effect, but found that these factors had little practical significance to the auditor's materiality judgment. Another relationship whose applicability to materiality judgments has been considered is that between the dollar effect and earnings per share [Rose, Beaver, Becker and Sorter, 1970]. Frishkoff [1970], however, included this factor in his study and did not find it to have a significant effect on materiality decisions. The dollar effect relationship to liquidity appears to be an important factor when the existing state of nature primarily concerns the balance sheet [Ward, 1976; Reininga, 1968; and Woolsey, 1954b]. The dollar effect can be assessed with respect to an individual account affected, in relation to an aggregation (e.g., effect on total assets), or in terms of the effect on various ratios (e.g., the quick ratio). Woolsey [1954b] found that if the materiality decision concerned a contingent liability, auditors considered the effect on working capital as an important factor. Messier [1979]

reported that when the materiality decision involved a writedown of inventory, the percent effect on total inventory was important to the judgment of some individual auditors, but that the effect on net income remained the dominating factor. Similar conclusions, with different circumstances associated with the existing state of nature, have been made by Boatsman and Robertson [1974] concerning the effect on working capital; by Hofstedt and Hughes [1977] concerning the percent effect on subsidiary investments; and by Moriarity and Barron [1976] concerning the effect on total assets and debt to equity ratio. Based on the above research it may be concluded that the auditor considers the relationship of the dollar effect to both the balance sheet and income statement to be important, with greater significance being attached to the relationship of the dollar effect to net income.

Criteria application. The dollar effect satisfies all three selection criteria. In an IACW materiality judgment the dollar effect is the estimated dollar effect of the errors due to an IACW. The auditor should estimate the dollar effect due to an IACW using a two step process. The first step is to estimate the total dollar flow through an IAC area where an IACW is located (e.g., total cash disbursements). The total dollar flow represents the maximum dollar effect a firm would be exposed to if the IACW caused a 100% error rate in that IAC area. The second step is to estimate the potential error rate of the errors that may occur due to the IACW.[18] The equation for determining the most likely dollar effect due to an IACW would be the potential error rate multiplied by the estimate of the

dollar flow through the specific internal control point.[19] Since this factor is a direct estimation of the dollar exposure of errors caused by an IACW, it satisfies the first criterion. This factor also meets the second criterion because this type of estimation of the dollar exposure was advocated by Martin and Johnson [1978]. Other authors have also suggested that the auditor needs to estimate the dollar effect of IACWs, but do not detail procedures for use in deriving the dollar exposure [Fisher, 1978; AICPA, 1978b].[20] The dollar effect also satisfies the third criterion of factor selection. Although the dollar effect is not relevant to determining whether IAC properties are present, it is an indication of the seriousness of not achieving the IAC objectives and maintaining the IAC properties.

Summary of Factors Satisfying the Factor Selection Criteria

Table 2.2 lists the factors that satisfied the criteria for factor selection. Of course an auditor is not likely to use each of these factors in every IACW materiality judgment because these factors may be intercorrelated and could contain the same information or be irrelevant to the particular judgment. Nevertheless, based on the evidence in the previous section, it may be assumed that the selected factors are most likely to be the primary factors that the auditor would perceive to be important in an IACW materiality judgment.[21] In order to derive more information on the validity of this assumption, formal interviews were conducted with a small sample of CPAs.[22] A summary of the results, relevant to factor selection, is given in the next section.

TABLE 2.2
FACTORS WHICH SATISFIED THE THREE SELECTION CRITERIA

General Factor Category	Specific Factors which Satisfied Selection Criteria
Environmental Factors	NONE
Enterprise Related Factors	Quality of Management and Personnel
	Business Risk--nature of items affected by IACW
	Size of auditor's client
	Cost/Benefit considerations
Accounting Policy Related Factors	NONE
Uncertainty of the Existing State of Nature	Potential error rate
Surrounding Circumstances associated with the Existing State of Nature	Type of IAC affected by the IACW
Dollar Effects	Expected dollar effect

Summary of Interview Results Concerning Factors in the IACW
Materiality Judgment

As indicated above, a primary purpose of the pre-experimental interviews was to obtain additional insights into the importance of the factors selected as potentially relevant in an auditor's IACW materiality judgment.[23] The interviews focused upon the auditor's preliminary evaluation of IAC and the IACW materiality judgment at that point of the audit.

The primary means by which information on the importance of the IACW materiality factors was obtained were a series of objective rating questions and a self-weighting allocation task. The eight factors[24] which satisfied the factor selection criteria were each rated by the interview participants on a 9-point monotonic scale, ranging from "1 = Not Important at All" to "9 = Extremely Important." Each interview participant also allocated 100 points to the eight factors plus any other factors the participant considered important. The participants also had an opportunity (in an open-ended question) to mention additional important factors relevant to the auditor's IACW materiality judgment.

Each IACW materiality factor which satisfied the factor selection criteria, except for the size of client factor, was considered to be important in the IACW materiality judgment by at least some of the interview participants. A summary of the responses given by the participants is shown in Table 2.3. The size factor was considered to be unimportant by all the participants, who rejected the proposition that it met the first criterion.[25] The participants considered that if an IACW was material (immaterial) for one size of client, the same IACW (given a proportional relationship for all other factors) would

TABLE 2.3

SUMMARY OF PRE-EXPERIMENT INTERVIEWS

(Perceived Important Factor Responses)

SUBJECTS	Likert Questions (Section C) 1 = not important at all 5 = Extremely Important					Average	Average Rank	100 Point Scale Weighting Questions (Section D)					Average Weight	Avg. Rank
FACTORS	1	2	3	4	5			1	2	3	4	5		
THE QUALITY OF MANAGEMENT	2	7	4	6		5.75	4.5	12	6	9	9		8	6
THE QUALITY OF PERSONNEL ASSOCIATED WITH AN ACCOUNTING FUNCTION	6	8	2	6		5.50	6	12	10	5	4		5	5
THE TYPE OF ASSETS OR TRANSACTIONS AFFECTED	6	4	8	7		6.00	3	12	3	24	14	13.75		2
SIZE OF CLIENT	1	3	3	1		2.00	8	5	3	5	4	4.25		9
COSTS/BENEFITS OF CORRECTING THE WEAKNESS	8	2	3	6		4.75	7	15	1	1	10	6.75		7
POTENTIAL ERROR RATE	4	8	7	2		7.00	2	10	3	10	12	11.25		3.5
MISSING INTERNAL CONTROL ATTRIBUTE CREATED BY THE WEAKNESS (e.g., lack of segregation of duties)	6	6	7	4		5.75	4.5	14	6	25	10	11.25		3.5
EXPECTED DOLLAR EXPOSURE DUE TO WEAKNESS	8	9	5	8		8.50	1	20	16	15	14	16.25		1
OTHER FACTORS: INDUSTRY CLIENT IS IN (AMOUNT OF REGULATION)	----not rated----										8		2	11
KNOWLEDGE OF CLIENT (RELATION WITH EXTERNAL ENVIRONMENT)	----not rated----										10		2.5	10
EXISTENCE OF COMPENSATING CONTROLS	----not rated----									25			5.5	8

be material (immaterial) for a client of a different size. Their
reasoning was that there are sufficient compensating controls
(e.g., owner review to offset lack of segregation of duties)
available to the small client to offset the greater resources
available to the large firm. They further considered that given
these compensating controls the probability of an error occurring
for any particular IACW would be the same for large or small clients.
If their comments were representative of the auditor population, then
the resources available to a particular client for the development of
an IAC system would not seem to be an important consideration. In the
face of the participants' response and since the original argument
about the size factor and the first criterion was not strongly based,
this factor was rejected for the purpose of this study.

One interview participant attached importance to two factors
that were rejected previously by the selection criteria.[26] These
factors are the regulatory environment within which the clients'
business operates and general knowledge of the clients' relationship
with its external environment. These factors were rejected because
they did not satisfy the third criterion: that is, they were con-
sidered to be too general for the auditor to apply to any materiality
judgment of a specific IACW. This conclusion was arrived at for three
reasons. First, the participant said that these factors are more
likely to be considered in a review of a particular materiality de-
cision (e.g., the audit partner concurs with the manager's materiality
decision) and not as factors in determining whether or not a particular
IACW was material or not. Second, the participant considered the factors
as only somewhat important to an IACW materiality decision and were not

identified as primary factors used in an IACW materiality decision
(i.e., these factors were not among the three most important factors
as rated by the participant). Finally, no other participant
mentioned any environmental factors as being relevant to an IACW
materiality judgment. Therefore, it is concluded that these factors
are probably not very important to most auditors' IACW materiality
judgments.

Summary and Conclusions

This chapter attempted to answer the first research question
concerning the factors that have potential importance to IACW
materiality judgments of auditors. Essentially two types of evidence
were presented: 1) a priori evidence based on logic and a review of
the literature, and 2) results from interviews conducted with a small
sample of auditors.

It is assumed, based on the evidence presented in this chapter,
that the factors most likely to be perceived as important factors in
an IACW materiality judgment by an auditor are:

      1)   Expected dollar effect of an IACW

      2)   Potential error rate due to an IACW

      3)   Type of IAC affected by the IACW

      4)   Risk--the type of asset affected by the IACW

      5)   Quality of management and personnel

      6)   Cost/benefit considerations.

The next chapter will present the methodology used in this study for
an experiment concerning the impact of certain of these factors
upon auditors' IACW materiality judgments.

[1]The two definitional elements of a material IACW are 1) the probability that the IACW will cause a material error and 2) the dollar exposure of errors due to the IACW [AICPA, 1973].

[2]These properties are the properties associated with a strong IAC system. The properties are: competent personnel, adequate segregation of duties, authorization procedures, adequate accounting documentation, procedures for record keeping, safeguarding of assets and records, and independent checks on performance [Arens and Loebbecke, 1976].

[3]The second edition of Arens and Loebbecke [1980] combine "adequate documents and records" and "proper procedures for record keeping" into one property. Nevertheless, the discussion presented in this section is consistent with their new edition.

[4]See Robertson [1979] and Martin and Johnson [1978] for further discussions on how auditors may evaluate personnel.

[5]Other properties included in Ashton's study were: proper procedures for authorization, adequate documents and records, proper procedures for record keeping, and independent checks on performance. A factor also considered by Ashton was previous years audit results.

[6]Similar results have been found by Hamilton and Wright [1977], Ashton and Kramer [1980] and Ashton and Brown [1980] in replications and extensions of Ashton's original work. The primary difference between these studies and Ashton's study is that the effects of audit experience was isolated. Nevertheless, segregation of duties was still found to be the primary influence in the subjects' evaluative judgments.

[7]This assumption appears reasonable because it is difficult to imagine a material IACW that, in the long run, would benefit one of the above parties at the expense of another party. Nevertheless, it is acknowledged that this assumption may not always hold.

[8]It is assumed that the expected dollar exposure due to the IACW has a positive linear relationship to the expected dollar exposure of the errors and irregularities due to the IACW. That is, the greater the expected dollar exposure of errors and irregularities due to the IACW implies a larger expected dollar exposure to all relevant parties.

[9]See FASB [1975] for more such "definitions."

[10]A condition set forth in FASB Statement No. 5 to accrue for a loss contingency is that the amount of the loss can be reasonably estimated. The FASB states that when the estimate involves a dollar range and a single dollar amount is a better estimate than any other amount in the range, the amount shall be accrued. Using the most likely dollar effect as an estimate of the expected dollar effect appears to be consistent and similar to the circumstance described in FASB No. 5.

[11]That is the existing dollar exposure related to management or to the auditor or to a creditor or to a stockholder or to any relevant decision-maker will increase as the expected dollar effect becomes greater.

[12] This level of utility is assumed to be the auditor's (manager's) level of utility, and not the auditor's estimate of external users' level of utility (see Chapter I in which this type of assumption related to the auditor's behavior is discussed.).

[13] This assumes that the dollar exposure is minimized, for all relevant parties, when financial statements are fairly presented.

[14] This is consistent with the three standards of field work as given in the AICPA's Professional Standards of Auditing [AICPA, 1973].

[15] See Frishkoff [1970] and Moriarity and Barron [1976].

[16] Her definition of the uncertainty factor was consistent with the definition given in this study. That is, she defined uncertainty in terms of the probability of future consequences.

[17] The auditor may also consider the types of IACW from the perspective of the IAC area within which the IACW occurs (e.g., cash, sales and receivables, inventory). However, this has already been raised in connection with the risk factor and will not be repeated here. (Supra, page 54).

[18] See discussion of the uncertainty factor, page 60-62 for elaboration on the relevance of the potential error rate to the IACW materiality judgment.

[19] This assumes that the individual transactions within the IAC area have the same error rate (regardless of dollar size or type of errors). If this is not true, the auditor should stratify the population to derive the most likely dollar effect.

[20] The auditor may use his estimate of dollar exposure of an IACW within an absolute analysis or in a comparative analysis for his materiality judgment. That is, the auditor may use the absolute magnitude of the dollar effect or may compare the dollar effect to net income (or some other relevant base) in making his materiality judgment. The auditor could also use his estimate of the dollar exposure of an IACW in the cost/benefit factor. The dollar effect would represent the expected benefits of correcting the IACW.

[21] This must be considered within the context of this study which assumes that an IACW has no compensating control. That is, compensating controls used as a factor in the auditor's IACW materiality judgment are considered to be beyond the scope of this study (see Chapter I).

[22] The participants in the interviews were four audit managers from four national CPA firms. All the participants were from Jacksonville, Florida.

[23] See Appendix A for the interview methodology and instrument.

[24] The quality of management and personnel was divided into two separate factors: the quality of management and the quality of personnel associated with an accounting function.

[25] Infra: page 55.

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[26]Another interview participant (Number 2) mentioned an additional
factor which he perceived to be important in an IACW materiality
judgment. The factor suggested was the existence of compensating
controls. Interview participants were told to assume no compen-
sating controls existed when responding to the interview's questions
and were told to only consider factors exclusive of compensating
controls (i.e., what factors do auditor's perceive to be important
in the IACW materiality judgment besides the existence of com-
pensating controls?). This was done because the inclusion of the
compensating control factor was considered to be beyond the scope
of this study (see Chapter I). This participant must have mis-
understood the interview instructions in this respect.

CHAPTER III
METHODOLOGY

Introduction

The purpose of this chapter is to describe the methodology used
to address the following research questions:

--Can the auditor's judgment of the materiality of IACWs be
described by a mathematical model?

--Is there consensus across auditors regarding the IACW
materiality judgment?

--How much "self-insight" does the auditor have into his
judgment process?

The chapter presents two major sections. First, the fixed
effects analysis of variance model (ANOVA) (employed in describing
and investigating judgment processes) and the pairwise comparison
procedures are described. Included in this section is an example
of the incomplete pairwise comparison procedure and calculation of
scale values.

Second, the experimental design is presented. In this section
the experimental variables (independent, moderating and dependent)
are presented, the experimental task and setting are reviewed and
the data analysis procedures and limitations of the experiment are
described. This section includes a discussion of the control
techniques used in the pairwise comparison task. The above research
questions are reviewed and the detailed procedures used to answer
the questions are presented. This section also includes descrip-
tions of the administration of the experiment and the subjects.

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The Model

ANOVA

Several researchers have used ANOVA to model and describe the judgment process. Examples of these studies include Hoffman, Slovic and Rorer [1968]; Slovic [1969]; Ashton [1974]; and Joyce [1976]. The primary advantage of ANOVA is that it allows for the examination of both linear and configural factor usage by the expert judge (auditor). The formulation of a fixed effects ANOVA model for judgments involving two factors would be:

$$J_{ijk} = M + A_j + B_k + AB_{jk} + E_{ijk} \qquad , \qquad (1)$$

where J_{ijk} is the ith judgment for a case that was observed to have level j with respect to factor A, and to have level k with respect to factor B; M is the grand mean for all judgments J; A_j and B_k are the main effects due to factors A and B respectively; AB_{jk} represents the effect of the interaction between factor A and factor B; and E_{ijk} is the random error component (assumed to be independent and normally distributed) in each individual's judgment model.

A significant main effect (say for factor A_j) would imply that the judge's response varies systematically with changes in the level of the particular factor (A_j) when the levels of the other factors (B_k) are held constant. If in a particular judge's model only the main effects are significant, this would indicate that the judge's responses can be described as an additive combination of the individual factors.

A significant two factor interaction (AB_{jk}) indicates that the judge is responding to specific patterns of the two factors; that is,

the interpretation of one factor (say A_j) is dependent upon the level of another factor (B_k). This dependency of a factor upon other factors is called configural factor usage and represents a more complex type of information usage by the judge.

ANOVA modeling research has consistently shown that (1) the main effects account for nearly all the explained variance in individuals' judgments and (2) the models explain a high proportion of the variance in the individuals' judgments [Ashton, 1974; Joyce, 1976]. In addition to the ANOVA model, an estimate of the individual factor's proportion of explained variance is normally derived for all significant effects by means of the omega-square statistic [Hays, 1973].[1] This statistic provides an estimate of the total variance in the individual's judgment that can be attributed to a specific factor (through its main effects and interaction effects). Finally, fixed effects ANOVA models are typically restricted to using independent factors which 1) are represented by categorical levels rather than continuous variables (e.g., high vs. low) and 2) are orthogonal (statistically independent). The orthogonality of the factors is ensured by use of a factorial design.[2]

Pairwise Comparison Measure

This study applied a pairwise comparison procedure to obtain the dependent variable(J_{ijk}) in the subjects' ANOVA models. The pairwise comparison procedure is adapted from Bechtel [1976] and Torgerson [1958]. The advantages of the procedure are 1) the dependent variable may be interpreted as a measure of relative strength and direction assigned by the subject to a particular stimulus (IACW) as compared to another stimulus and 2) the scale values assigned to

a set of stimuli (IACWs) may be more discriminating than those obtained using a single rating scale since they are derived from several observations for each stimulus.

Complete pairwise comparison procedure. A complete pairwise comparison procedure would require the subjects to compare and rate each stimulus with all other stimuli in the experiment. To illustrate this, consider that a subject is asked to compare and rate the materiality of four different IACWs (A, B, C and D). Since there are four IACWs, this would require the subject to make six pairwise comparisons (A to B, A to C, A to D, B to C, B to D and C to D). The primary advantage of the complete pairwise comparison procedure is that it allows for a check on the internal consistency of the subject. That is, the data generated from the pairwise comparison procedure may be checked for the number of transitivity errors contained in the data. However, this advantage of a complete pairwise comparison task may be offset by the fact that the procedure is difficult and time consuming. Subjects may become bored and fatigued if they must respond to a large number of comparisons. Modest increases in the number of stimuli quickly raise the number of comparisons to onerous levels. For example, if the number of stimuli is raised from four to twelve, the number of complete pairwise comparisons jumps from six to 66. Where a subject provides responses to a large set of comparisons and these are found to be internally inconsistent, this could be attributed to either the task or the subject's judgment process. Hence, in order to overcome the disadvantage of fatigue and potentially unreliable data, incomplete pairwise comparison procedures are necessary.[3]

Incomplete pairwise comparison procedure. Torgerson [1958]
has suggested the use of a simple incomplete pairwise comparison
procedure to derive a scale for a large number of stimuli without
having to perform the complete pairwise comparison procedure. The
procedure involves dividing the total set of stimuli into two sub-
sets. One subset would be considered the standard stimuli and the
other subset would be the comparison stimuli. The reduction in the
pairwise comparison judgments comes about because this procedure only
requires the subject to compare all the comparison stimuli to each
standard stimuli. To illustrate this reduction, consider the example
of 12 stimuli. Assume the set of stimuli is divided into four
standard and eight comparison stimuli. The reduced procedure would
require the subject to make 32 comparisons (4 X 8), whereas a complete
pairwise procedure would require 66 comparisons [(12 X 11)/2].

The standard stimuli selected should contain the information
most relevant to the dimension of interest (e.g., materiality).
That is, the standard stimuli selected should be spaced out over
the length of the dimension scale (e.g., very material to immaterial).[4]

Finally, the scale value for each stimulus is used as the
dependent variable in the ANOVA models. To illustrate how the scale
value for each stimulus is calculated, consider the following
simplified example. Assume that a subject is asked to rate the
comparative materiality of four IACWs (A, B, C and D). Assume the
rating was made on a scale which has an interpretive range from
-3 to +3. The rating would take the form of: IACW A: _3_ : _2_ : _1_ :
_0_ : _1_ : _2_ : _3_ : IACW C. If there are four IACWs, this would
require six pairwise comparisons in a complete procedure. However,

assume that IACWs A and B are chosen as standard stimuli and C and D
are chosen as comparison stimuli. This incomplete procedure would
require only four comparisons (A to C, A to D, B to C and B to D).
The subject's materiality rating for one IACW over another IACW is
expressed by circling the appropriate number on either side of zero;
indifference on the part of the subject is represented by circling
zero. Assume the individual responded as follows:

IACW A over C = 3
IACW A over D = 2
IACW C over B = 1
IACW D over B = 3

The following materiality data matrix would then be constructed, where
it is interpreted as row materiality over column materiality:

Standard IACWs \ Comparison IACWs	C	D	Row Total	Row Average (Scale Values)	
A	3	2	5	2.5*	
B	-1	-3	-4	-2.0*	
Grand Average ([3+2-1-3]÷4)					.25
Column Total	2	-1			
Column Average	1	-.5			
Grand Av. - Col. Av. (scale values)	-.75*	.75*			

The "*" numbers are the calculated scale values for the respective
IACWs. The row averages are materiality scale values for the standard
IACWs; the grand average minus each column average represents the
scale values for the comparison IACWs. Torgerson [1958] has shown that

the above calculations are the least-squares estimates of the scale

values of the stimuli.[5] The interpretation of the materiality scale

values are: the subject definitely rates IACW A (2.5), as compared

to the other IACWs, to be most material, followed by IACW D (.75),

then IACW C (-.75) and finally the least material of the four IACWs

is IACW B (-2.0).

Experimental Design

Experimental Setting and Subjects

The subjects (Ss) for the experiment were 38 practicing auditors

from five large national public accounting firms located in Miami,

Florida, and Houston, Texas. All Ss were required to have at least

two years of experience and were senior level auditors who would

typically be in charge of the fieldwork during an audit.[6]

Ss were told to assume (see Appendix B, Booklet 1) that they are

the seniors-in-charge of a current audit for a fictitious dental

supply company. The Ss received information concerning the IACWs

that were identified prior to any compliance testing or substantive

testing. The task required the Ss to make judgments concerning their

preliminary evaluation of the materiality of the identified IACWs.[7]

Independent Factor Selection

The bases of selection of the independent factors (to be

manipulated in the experimental design) were 1) the conclusions of

Chapter II with regard to the important factors in an IACW materiality

decision, 2) the feedback received from pre-experimental interviews

regarding the importance and the measurement of factors used in the

preliminary IACW materiality judgment, and 3) the need for factors that could be manipulated throughout a set of individual IACWs. These considerations led to the choice of three factors as independent variables.

The first factor is the type of missing IAC attribute created by the IACW (TYIAC).[9] This factor was manipulated at two levels. Each IACW represented either a lack of formal authorization for execution of a transaction or a lack of segregation of duties as to asset custody and record-keeping.

The second factor is the type of asset affected by the IACW (AS). This factor was manipulated at three levels. Each IACW affected either cash (cash disbursements), dental supplies (floss, silver, brushes, drills, etc.), or dental equipment (x-ray machines, chairs, stools, etc.).

The third factor is the maximum dollar effect due to the IACW (DOL). This factor is used rather than the most likely dollar effect due to the IACW (expected dollar effect due to the IACW) because the latter factor could not be operationalized in the experimental design.[10] In an IACW materiality judgment, the most likely dollar effect is assumed to be closely related to the maximum dollar effect, since the most likely dollar effect is approximately equal to the maximum dollar effect times the potential error rate due to the IACW. To control for the most likely dollar effect in the experimental design, Ss were told to assume that the potential error rate is the same for each IACW. The maximum dollar effect was then manipulated at two levels. Each IACW either involved a high dollar effect or a low dollar effect. Since the experimental design involved one hypothetical

company, this factor was operationalized by creating two divisions in the company at separate locations (Michigan and California). Each division had identical IACWs except that one division was large and had a high dollar effect and the other division was small with a low dollar effect for each IACW.

The three independent factors selected were then manipulated in a 2 X 3 X 2 factorial design. This design then required the creation of twelve IACWs (see Appendix B for case and tasks). This experimental design is shown in Figure 3.1.

Background Data

While only three factors were manipulated in the experimental design, Chapter II and pre-experimental interviews (Appendix A) indicated there were other important factors in the preliminary IACW materiality decision (e.g., quality of management and personnel, potential error rate). As many of these factors as possible were incorporated in the experimental materials (Appendix B, Booklet 1) as unchanging background data for the company. The data concerning the hypothetical dental supply wholesaler were compiled from 1979 Security and Exchange Commission 10-K reports for two Dental Supply Wholesale Companies.

Dependent Variables and Tasks

Two sets of dependent variables were elicited from each S during the experiment. This required the use of two different tasks (see Appendix B where Task 1 is the pairwise comparison and Task 2 is the single rating procedure). The reasons for the elicitation of two sets of dependent variables were

Individual[1]

Type of Missing IAC Attribute (TYIAC)			
Lack of Segregation of Duties		Lack of Formal Authorization	
Maximum Dollar Effect (DOL)			
High (Mich.)	Low (Calif.)	High (Mich.)	Low (Calif.)

Type of Asset Affected by IACW (AS)	High (Mich.)	Low (Calif.)	High (Mich.)	Low (Calif.)
Cash	IACW #1 (7)	IACW #7 (1)	IACW #2 (8)	IACW #8 (2)
Dental Supplies	IACW #3 (9)	IACW #9 (3)	IACW #4 (10)	IACW #10 (4)
Dental Equip.	IACW #5 (11)	IACW #11 (5)	IACW #6 (12)	IACW #12 (6)

Group[2]

IACW Set used as Standards			
A		B	
Order of Presentation			
1	2	1	2
Group 1 Ss	Group 2 Ss	Group 3 Ss	Group 4 Ss

Each S evaluates 12 IACWs

[1]Weaknesses are numbered according to how they are presented in the experimental materials shown in Appendix B (This was one of two orders presented to Ss. The numbers in the parentheses represents the second order presented to Ss.) There is one observation per cell for each S (i.e., the S was presented all 12 IACWs which represents a full factorial experiment). The observation for each cell is the S's pairwise comparison scale value for that particular IACW. This represents the dependent variable for the ANOVA.

[2]This is an example of a group analysis to examine differences in Ss' judgments due to either standard set or order of presentation received. It is known as a nested repeated measures design [Winer, Chapter 7, 1971]. The Ss are nested within the Standard and Order conditions and they are crossed (receive all combinations) with all the treatments (IACWs). Similar designs were used for assessing the effects of firm affiliation, risk attitude, experience, location and motivation on the Ss' judgments.

FIGURE 3.1
EXPERIMENTAL DESIGN

1) to use a multi-method approach in order to test the validity
of each S's data. That is, the dependent variables
obtained from the two tasks should be positively correlated
since the variables purportedly are measures of the same
attribute (i.e., the materiality of the IACWs).

2) to obtain a relative evaluation of materiality from each S
(materiality of IACW A as compared to IACW B) and an
absolute evaluation of materiality from each S (IACW A is
or is not material).

The first task involved the Ss pairwise comparison response   to the
relative significance of each IACW. The second task required the Ss
to classify each IACW as material or not material and to then rate the
level of materiality for the material IACWs.

Pairwise comparison task. The incomplete pairwise comparison
procedure was used to obtain the relative materiality ratings of each
S. The 12 IACWs were divided into four standard IACWs and eight
comparison IACWs. Two sets of standard and comparison IACWs were
used.[11] An attempt was made to select standard IACWs which were
spaced over the relative materiality range of the 12 IACWs. The
selection procedure was the following:

1) In order to rank the 12 IACWs from most material to least
material, on an a priori basis, it was assumed that:
a) an IACW representing a lack of segregation of duties
is more material than an IACW representing a lack of formal
authorization; b) an IACW affecting cash is more material
than an IACW affecting dental supplies or dental equipment,

and an IACW affecting dental supplies is more material than
an IACW affecting dental equipment; and c) an IACW involving
a high dollar effect is more material than an IACW involving
a low dollar effect.

2) Given the above assumptions, a simple ranking of the 12 IACWs
can be made using an absolute dominance criterion. That is,
count the number of times (minimum = 0 and maximum = 11) an
IACW clearly dominates the other 11 IACWs using the above
assumptions. It is then assumed that the IACW which
dominated the other IACWs the most times is the more material
IACW. Table 3.1 summarizes the dominance ranking and shows
the selected standards used in this study.

3) Finally, the two sets of standard IACWs were selected by
dividing the 12 IACWs into three sections. IACWs #1 and #3
were considered the most material and each one was assigned
to one of the standard sets (A or B). Two IACWs were
randomly chosen for each standard set from the six IACWs
with dominance counts ranging from two to five. The last
standard for each set was randomly chosen from the remaining
four IACWs which had dominance counts of zero or one. Each
IACW could appear in only one standard set.

In pilot tests conducted for this study it was found that the two sets
of standards did not generate significantly different materiality
ratings. One pilot $\underline{S}$ completed a full pairwise comparison procedure
using the 12 IACWs. Three materiality scales were calculated for this
$\underline{S}$: a scale calculated from the full set of pairwise comparisons and
scales calculated from the sets of incomplete comparisons relevant to

TABLE 3.1
DOMINANCE RANKINGS OF SELECTED STANDARD SETS

IACW # AND DESCRIPTION*	DOMINANCE COUNT	STANDARD SET (A or B)
#1-- LSD, H, C	11	A
#3-- LSD, H, DS	7	B
#2-- LFA, H, C	5	B
#7-- LSD, L, C	5	B
#9-- LSD, L, DS	3	A
#4-- LFA, H, DS	3	-
#5-- LSD, H, DE	3	-
#8-- LFA, L, C	2	A
#11- LSD, L, DE	1	-
#10- LFA, L, DS	1	-
#6-- LFA, H, DE	1	A
#12- LFA, L, DE	0	B

*KEY--LSD = Lack of Segregation of Duties
      LFA = Lack of Formal Authorization
      H   = High Dollar Effect
      L   = Low Dollar Effect
      C   = Cash
      DS = Dental Supplies
      DE = Dental Equipment

standard set A and standard set B. There were no significant differences between the three scales and all three scales revealed significant positive correlation.[12] Second, seven other pilot Ss performed the experimental task using either standard set A (three Ss) or standard set B (four Ss). In a group analysis using a repeated measures ANOVA [Winer, 1971], the two standard sets were associated with no significant difference in the S's judgments. Therefore, it was assumed that the two standard IACW sets were equivalent and would not affect Ss' judgments.

The incomplete pairwise comparison procedure required Ss to rate each standard IACW relative to all the comparison IACWs. A summary of the rating form and scale calculation is shown in Figure 3.2. Since there were four standard IACWs and eight comparison IACWs, Ss made 32 pairwise comparisons. The comparisons were presented in one of two randomized orders. Furthermore, the first three comparisons were randomly drawn from the set of pairwise comparisons not included in the 32 required comparisons. This provided an opportunity for the S to become familiar with the task (i.e., practice judgments). The last five comparisons presented to the Ss were "repeats," randomly chosen from the first 20 required comparisons (thus, each S made 40 pairwise comparisons). The repeated comparisons were used as a reliability check on the Ss' motivation and seriousness in performing the task. Two of these comparisons were in reverse order to the initial comparison. The five repeated comparisons were used as a test-retest reliability measure by comparing the S's original responses to the repeated comparison responses. If two or more of the S's responses differed from earlier responses to the extent that the zero

FIGURE 3.2

PAIRWISE COMPARISON CALCULATIONS

1) Ss made comparisons of all the IACWs as follows:

IACW #i is as: Much Better $\underline{3}$: $\underline{2}$: $\underline{1}$: $\underline{0}$: $\underline{1}$: $\underline{2}$: $\underline{3}$: Much less significant than IACW #j.

where, 3 = very close to that end
        2 = moderately close to that end
        1 = somewhat close to that end
        0 = neutral or indifferent

2) Ss received one of two sets of incomplete comparisons randomized in one of two orders, for the purpose of constructing the individual S's materiality scale for the 12 IACWs. (Ss were randomly assigned to the four sets of cases)

The two data matrices for the Ss were then the following:

SET A

Standard IACWs \ Comparison IACWs	2	3	4	5	7	10	11	12
1	x	x	x	x	x	x	x	x
6	x	x	x	x	x	x	x	x
8	x	x	x	x	x	x	x	x
9	x	x	x	x	x	x	x	x

SET B

Standard IACWs \ Comparison IACWs	1	4	5	6	8	9	10	11
2	x	x	x	x	x	x	x	x
3	x	x	x	x	x	x	x	x
7	x	x	x	x	x	x	x	x
12	x	x	x	x	x	x	x	x

x = like comparisons between the two sets

3) IACW scale measures for each S are calculated as follows (provides a set of 12 scale values, one materiality rating for each IACW for each S--these = the set of dependent variables for each S's MANOVA Prob.4):

SET A: IACW #s 1, 6, 8, 9 scale measures = Row average of ratings (sum of Row/8)
        IACW #s 2,3,4,5,7,10,11,12 scale measures = Grand rating average - Column average
                                                     (sum all ratings/12 - sum of column/4)

SET B: IACW #s 2, 3, 7, 12 scale measures = Row average of ratings
        IACW #s 1,4,5,6,8,9,10,11 scale measures = Grand average - Column average

point on the rating scale was crossed (i.e., he rated an IACW, that was originally rated to be more material, to be less material than the comparison IACW), his data were considered to be unreliable and were excluded from further analysis.

The pairwise comparison task provided a set of IACW materiality measures for each $\underline{S}$.[13] The set of scale values was used as the dependent variables in each $\underline{S}$'s ANOVA model. The set of measures provided an insight into each $\underline{S}$'s perception of the relative significance of the IACWs. The set of measures also was used to judge the consensus among the auditors.

Single rating task. The second task required: 1) a dichotomous classification of whether or not the IACW was material and 2) a rating of the level of materiality of those IACW's categorized by the $\underline{S}$ as material. A five point rating scale was employed, where one was described as "barely material" and five was described as "very material." The single rating task had two purposes. First, the ratings were used to validate the pairwise comparison scale obtained in the pairwise comparison task. This was done by correlating the pairwise comparison measures to the single rating scale (where a "not material" IACW was assigned a zero rating) for each $\underline{S}$. If the two scales were not significantly and positively correlated (at $\alpha \leq .2$), the $\underline{S}$'s data were considered to be invalid.[14] Second, the dichotomous classification was used as another descriptive measure of consensus among auditors (e.g., the percentage of auditors that agreed that IACW #1 was material).

Description of the Auditor's Judgment Process

In Chapter II it was suggested that the auditor's IACW materiality judgment can be interpreted using the probability and dollar exposure oriented factors. The three independent factors in this experiment are surrogates for these unobservable factors (probability and dollar exposure). The TYIAC and AS factors are presumed to be relevant in estimating the probability of errors occurring due to IACWs. The DOL factor is presumed to be relevant in estimating the dollar exposure permitted by IACWs. Since the three factors are relevant only to probability and dollar exposure, the interpretation of an auditor's IACW materiality judgment model is made in terms of probability and dollar exposure.

It is reasonable to expect that auditors evaluate IACWs to be material under one of the following circumstances: I) the individual probability factors indicate a high probability of errors occurring (one or both factors), II) the dollar exposure factor indicates a large dollar exposure III) the combination of probability factors indicate a high probability of errors occurring, or IV) the combination of probability and dollar exposure factors indicate a large expected value of dollar exposure. In the present study the auditor's descriptive model would be represented by the three-way ANOVA model:

$$W_{ijkl} = M + A_j + B_k + C_l + AB_{jk} + AC_{jl} + BC_{kl} + ABC_{jkl} + E_{ijkl} \qquad , \qquad (2)$$

where W_{ijkl} is the ith IACW materiality measure that was observed to have level j with respect to factor A, to have level k with

respect to factor B, and to have level 1 with respect to factor C; M is the grand mean for the IACW materiality measures; A_j, B_k, and C_l are the main effects due to the TYIAC, AS and DOL factors, respectively; AB_{jk}, AC_{jl}, and BC_{kl} represent the effects of the interactions between the TYIAC and AS factors, between the TYIAC and DOL factors and between the AS and DOL factors, respectively; ABC_{jkl} represents the effect of the interaction between all three factors; E_{ijkl} is the random error component in each $\underline{S}$'s model (assumed to be independent and normally distributed).

In the above model, a significant main effect would indicate that the auditor's response varies systematically with changes in the level of the particular factor as the other factors are held constant. That is, the auditor evaluates the materiality of IACWs using each factor independently (representative of circumstances I and II on the previous page). A significant interaction (two or three-way) would indicate that the auditor's response was dependent upon the specific patterns of the two factors, and hence indicates configural information processing by the auditor. The two-way interaction between the TYIAC and AS factors is interpreted as a combination of probability factors (circumstance III), independent of the DOL factor. This interaction would represent a configural use of the probability factors in deriving a single probability estimate. The TYIAC X DOL and DOL X AS interactions are interpreted as a combination of the separate probability factors (TYIAC and AS) with the DOL factor. Both of these interactions effects represent an expected value determination by the auditor

(Probability X Dollar = Expected Dollar---circumstance IV). A sig-
nificant three-way interaction would indicate a highly complex con-
figural information processing pattern by the auditor. The inter-
pretation, however, is similar to the TYIAC X DOL and DOL X AS
interaction interpretations. That is, the three-way interaction
represents an expected value determination by the auditor (cir-
cumstance IV).

Unfortunately, it is impossible to estimate the full model
for the individual auditors in this study. This is because of the
use of a nonreplicated complete factorial design, which makes it
necessary to use some of the interaction terms to estimate error
(E_{ijkl}) for the auditor's judgment model.[15] This is not a
serious limitation, however, since it would be unlikely that all
effects of the full model would be significant for an individual
auditor. In fact, there are sub-models (of the full model) which
appear to be a more concise representation of the auditors judg-
ment process.

First, it is unlikely that the three-way interaction
(ABC_{jkl}) would constitute a significant effect within an auditor's
judgment model (even though it has a meaningful interpretation).
This assumption is reasonable since previous judgment studies have
shown that higher order interactions (three-way or more) were
negligible (e.g., Ashton [1974] and Joyce [1976]).[16] Hence, in
this study, the three-way interaction will not be estimated and
the degrees of freedom associated with this effect are included
in the estimation of the error term.

Second, it is considered to be unlikely that all three two-way interaction terms are compatible with each other in a single judgment model. That is, it is not expected that all two-way interaction effects would be significant for an individual auditor. It is assumed that the TYIAC X AS interaction is in-compatible with the other two-way interaction effects (TYIAC X DOL and AS X DOL). If the TYIAC X AS interaction is a significant interaction in an auditor's judgment model, the other inter-actions would not be expected to be significant nor have a mean-ingful interpretation (and vice versa if the TYIAC X DOL or DOL X AS effects are significant). The reason for this is due to the interpretation of the TYIAC X AS effect. The interpretation implies that the auditor derives a single probability estimate, independent of the dollar factor. Therefore it is assumed the auditor is not processing the information using an expected value formulation. This would not be unusual since the probability oriented factors are non-quantitative. On the other hand, the interpretation of the other two-way interaction effects will be assumed to imply the use of some expected value formulation in the judgment process. If these interaction effects are significant, these would indicate that the auditor is a fairly complex infor-mation processor. This is because the auditor would have to convert both the probability and dollar oriented factors into subjective quantitative terms (in order to formulate an expected value). Therefore it is reasonable to assume that this task (conversion procedure) is cognitively complex.

The previous discussion implies that there are potentially two separate sub-models which may be representative of the auditor's decision process. The first sub-model (model 1) includes the TYIAC X DOL and DOL X AS interaction terms. If one of these (or both) interaction effects is significant, the description of the auditors' judgment process appears to be representative of an expected value formulation. The second sub-model (model 2) includes the TYIAC X AS interaction term. If the interaction term is significant, the description of the auditors' judgment process is presumed not to be representative of an expected value formulation.[17] An ANOVA representation of the two models are the following:

Model 1

$$W_{ijkl} = M + A_j + B_k + C_l + AC_{jl} + BC_{kl} + E_{ijkl} \qquad , \qquad (3)$$

and

Model 2

$$W_{ijkl} = M + A_j + B_k + C_l + AB_{jk} + E_{ijkl} \qquad , \qquad (4)$$

where all the above terms have the same interpretation as previously described with the full model (equation (2)).

It is assumed in this study that both models potentially may be representative of the auditor's judgment process. Since Model 2 (as compared to model 1) is considered to be a simpler model (i.e., the model does not contain an interactive effect for both probability and dollar factors), it is expected that this model will describe the majority of auditors' judgment processes. Nevertheless, since both models have reasonable interpretations, two three-way ANOVA models (both model 1 and 2) were calculated for each $\underline{S}$'s IACW pairwise measures.

Since two models are being estimated for each S, a best model (1 or 2) needs to be chosen as a description of the S's judgment process. There are no statistical tests, however, to choose the best model between two partial models. Therefore the following criteria were applied to choose the descriptive model used in describing the S's judgment process:

1) Choose the model which obtains a significance level of .05 or better ($\alpha \leq .05$).

2) If both models obtain a significance level of .05 or better, it cannot be determined which is the best model. Therefore, the model which provides the greatest descriptive power, as indicated by the level of explained variance (i.e., R^2) is accepted as the descriptive model for that S's judgments.

The descriptive model chosen for each S was used for the remaining individual (e.g., self-insight) and group analyses.

In addition to deriving the most descriptive model for each auditor, the proportion of variance attributable to each significant main effect and interaction effect was calculated. This calculation was done by means of the omega-square statistic [Hays, 1973].[18] A large omega-square for a particular factor would imply that the factor accounted for a large proportion of total explained variance in the auditor's judgment model.

Auditors' Consensus

The degree of consensus among auditors' judgments can be evaluated using the data obtained in both tasks (pairwise comparison and single rating). Each S's pairwise comparison measures of the IACWs are converted into rankings (from least material to most material). The statistical test to be used to measure consensus is the Kendall Coefficient of Concordance W [Seigel, 1956]. The advantage of this statistic is that only ordinal data is required. The statistic is a non-parametric correlation test where the value of W may be converted to the average Spearman rank correlation coefficient.[19] A test of significance is available for W (whose statistic approximates a chi square distribution): the null hypothesis is that the rankings are unrelated.

A second measure of consensus also will be reported. This is a simple descriptive measure--the percentage of auditors who agree that the IACW is material.

Auditor's Insight Into His Judgment Process

The final issue examined in this study is the degree of self-insight of each auditor. In order to evaluate self-insight, each S was asked to allocate 100 points to the three independent factors so as to reflect the relative importance of each factor to his judgments.[20] This allocation was performed by each S at the end of task 2, in the debriefing questionnaire (see Appendix B, Booklet 4). The allocation of the 100 points by the individual Ss is referred to as the S's subjective weighting of cue importance.

Following the procedures of past researchers (e.g., Slovic [1969]; Ashton [1974]; Joyce [1976]) an insight index for each $\underline{S}$ will be calculated. The $\underline{S}$'s subjective weights are correlated with the adjusted objective omega-square weights obtained from his ANOVA model. The adjusted objective omega-square weights are obtained for each $\underline{S}$ by combining his unadjusted omega-squares related to interaction effects with the relevant main effects and standardizing the combination to sum to 100 over the three independent factors. In other words, the omega-squares originally calculated for each main effect (e.g., C_1) are adjusted by taking the omega-square values for the relevant interactions (e.g., AC_{j1} and BC_{k1}) and adding them to the related main effect omega-square (e.g., C_1). These adjusted main effect omega-squares are summed and each adjusted main effect omega-square value was divided by that sum. Accordingly, the adjusted objective omega-square weights are percentage scores which sum to 100. The insight-index is obtained as the correlation between the subjective weights and the adjusted objective weights.[21]

Additional Analyses

A debriefing questionnaire was included as Booklet 4 in the experimental materials (see Appendix B) in order to obtain information about the backgrounds of the $\underline{Ss}$ and their feelings toward the experiment.[22] Included in this questionnaire were questions regarding the $\underline{S}$'s risk attitude, representativeness of the experimental setting and the IACWs, $\underline{S}$'s experience and $\underline{S}$'s motivation[23] toward the experiment.

In group analyses, several nested design repeated measures ANOVAs[24] are calculated to assess the effect of S's firm affiliation, S's experience, S's risk attitude, S's location, standard set received and order received on the S's IACW materiality judgments. An analysis of covariance is also calculated to determine if S motivation or time taken to complete the tasks had a systematic effect on the S's judgments. In both the consensus and the self-insight analyses, firm and experience averages are calculated to assess subgroup variation in the consensus and self-insight measures. Other relevant averages (e.g., averages within standard sets' A and B) are also calculated for the consensus and insight indices in order to see if there were any systematic effects on these indices.

A summary of all the experimental analysis (individual and group) used in this study is shown in Figure 3.3.

Administration of the Experiment

Pilot tests. Pilot tests were conducted during May 1980. The participants were eight practicing CPAs who satisfied the S selection criteria used for this study. The experimental material generally was the same as that used in the actual study (see Appendix B).[25] The experimental materials consisted of

1) Introductory letter

2) General Instructions

3) Background Information and Summary of IACWs

4) Task 1 (Booklet 2) and Task 2 (Booklet 3)

5) Debriefing Questionnaire (Booklet 4).

1) Reliability of Data:
   a) Repeated comparisons in pairwise comparison procedure (test-retest)
   b) Correlate pairwise comparison scale to single rating scale

2) Individual ANOVA Models (based on comparison data):
   a) Estimate two models (1 and 2) for each $\underline{S}$
      i) Model 1-- Main effects + TYIAC X DOL and AS X DOL interactions
      ii) Model 2-- Main effects + TYIAC X AS interaction
      iii) Choose significant model or, if necessary, model which has largest R^2
   b) Calculate Omega-square for all main effects and interaction effects.

3) Group Analyses with Pairwise Comparison Data:
   a) Repeated Measures ANOVA [Winer, 1971] for--
      i) order and standard set effects
      ii) firm effects
      iii) city effects
      iv) experience and risk effects
   b) analysis of Covariance for motivation and time effects
   c) Given above results to a and b-- calculate average omega-square values within firms, experience levels, standards, order, city and factor effects (no statistical inferences)

4) Consensus Measures:
   a) with pairwise comparison measures for each $\underline{S}$
      i) rank $\underline{S}$'s ratings of the IACWs
      ii) Calculate Kendall's Coefficient of concordance W and average Spearman correlation coefficients (calculate Pearson product-moment correlation coefficients--compare to Spearman's)
         (a) across all $\underline{S}$s
         (b) $\underline{S}$s within firms and experience levels
         (c) $\underline{S}$s within standard sets
   b) Using $\underline{S}$s' yes and no responses on the materiality of each IACW
      i) percentage across all $\underline{S}$s who agree material or not material
      ii) percentages within firms and experience levels for judgment agreement

5) Self-Insight
   a) calculate adjusted omega-squares
   b) correlate, by $\underline{S}$, adjusted omega-squares to $\underline{S}$'s subjective weights
   c) Average insight-index within firms, standard sets, $\underline{S}$s with significant interactions (α=.05) compared to $\underline{S}$s without significant interactions
   d) other relevant average indices (experience)

FIGURE 3.3

SUMMARY OF EXPERIMENTAL ANALYSES

The primary change that followed from the pilot study was the deletion of the complete pairwise comparison procedure in favor of the incomplete pairwise comparison procedure. The only other changes to occur were some minor wording changes in the instructions and some editorial comments in the background information.

Primary study. The primary study was conducted in June 1980. Five national accounting firms (referred to as N1-N5) participated in the study. The Ss were chosen based on their willingness to participate. In general, a contact was made with a representative of each firm who solicited Ss to participate in the experiment. This resulted in 38 Ss participating in the experiment. All Ss completed the experimental materials shown in Appendix B.

Recall that there were two reliability criteria concerning the Ss responses. Four S's data failed to meet these criteria. First, Ss 24 and 34 failed the test-retest criterion. Both Ss changed two original responses on the repeated pairwise comparisons by crossing over the zero point on the rating scale. The second criterion, significant correlation between the pairwise comparison scale and the single rating scale, eliminated two other Ss (8 and 36) from further analysis. The results applicable to this criterion are summarized in Table 3.2.

After applying the reliability criteria, data for 34 Ss were considered reliable. Table 3.3 provides a summary of these Ss by firm, location, and experience.

TABLE 3.2
COMPARISON OF PAIRWISE SCALE TO SINGLE RATING SCALE
(Correlation Criterion for Subject Retention)

SUBJECT	CORRELATION OF PAIRWISE SCALE TO SINGLE RATING SCALE	SUBJECT	CORRELATION OF PAIRWISE SCALE TO SINGLE RATING SCALE
1	.55*	19	.81***
2	.99***	20	.80***
3	.55*	21	.89***
4	.93***	22	.97***
5	.86***	23	.94***
6	.85***	25	.67**
7	.73***	26	.58**
8	.36 ($\alpha=.26$)	27	.68**
		28	.87***
9	.98***	29	.83***
10	.87***		
		30	.81***
11	.49*	31	.89***
12	.88***		
		32	.92***
13	.55*	33	.92***
14	.59**		
		35	.75***
15	.95***	36	.34 ($\alpha=.28$)
16	.73***		
17	.94***	37	.92***
18	.74***	38	.90***

Note: Subjects number 8 and 36 are rejected from further analysis because of correlation criteria (did not obtain significance level of $\alpha \leq .2$).

Legend

* = significant at $\alpha \leq .1$
** = significant at $\alpha \leq .05$
*** = significant at $\alpha \leq .01$

TABLE 3.3
SUMMARY OF Ss BY FIRM, CITY
AND EXPERIENCE LEVEL

Firm-City	Years of Experience		
	2-3 years	more than 3 years	
N1-Houston	3	4	7
N1-Miami	3	3	6
N2-Houston	5	2	7
N3-Houston	6	1	7
N4-Houston	1	3	4
N5-Miami	0	3	3
	18	16	34

Limitations of the Experiment

The first limitation of the experiment relates to the distributional assumptions of ANOVA (as previously described). ANOVA is quite robust with respect to violations of the assumptions of homogeneity of variance (where there are equal observations per cell) and normality [Winer, 1971]. However, violations of the independence assumption can be more serious. The experiment requires repeated measures on each S. A problem in this type of experiment is that successive observations of the same S can lead to non-independence of experimental error components. The significance tests, therefore, may be distorted. In the present study, Ss were instructed to make each judgment independent of all other judgments. However, it can not be assumed that Ss' judgments were made independently (e.g., the S could follow an anchoring and adjustment heuristic). The results of the ANOVA significance tests need to be interpreted cautiously.

The second limitation of the experiment concerns the generalizability to other auditors. Since the Ss were not randomly selected from the population of auditors and the population of firms, statistical inferences cannot be made to these populations. For practical reasons, the Ss were selected by contacts from each firm, thus systematic biases may be present.

A third limitation relates to the generalizability of the results to other IACW materiality situations. Only three of the factors relevant to the IACW materiality decision were manipulated in the experimental design, and these factors were manipulated across only two or three of many possible levels. This can cause Ss boredom or lack of interest in the tasks if Ss feel the setting is unrealistic. However, responses to a debriefing questionnaire completed by Ss suggests that the decision setting and the IACWs were considered representative (see the sections in Chapter IV entitled "additional data").

The fourth limitation relates to the description of the S's judgment process. The ANOVA models provide a representation of the judgment process, but they are not purported to describe the S's real cognitive processes. Hayes [1968] has referred to this approach as a "black box" strategy. That is, the S's decision process is inferred by examining the relationship between the inputs (factors) and the outputs (judgments). The limitation is summarized best by Hoffman [1960, p. 125]:

> . . .the mathematical description of judgment is inevitably incomplete, for there are other properties of judgment still undescribed, and it is not known how completely or how accurately the underlying process has been represented.

Summary

In this chapter the ANOVA model and the pairwise comparison measure and procedures were described. The advantages of a pairwise comparison measure were also presented. The experimental tasks and design were then described. The tasks required that each S judge the materiality of 12 IACWs. Each S made 40 pairwise comparison judgments and 12 single rating judgments, based on various combinations of three factors in accordance with a 2 X 3 X 2 design.

The chapter also described the manner in which the data were analyzed. The S's judgment process and the application of two ANOVA models to examine that process were discussed. Correlation analysis and simple descriptive analysis were discussed in relation to assessing judgment consensus. In addition, it was explained how each S's "self-insight" into his judgment process can be assessed by correlating the adjusted omega-square values with the subjective weights provided by each S.

Finally, the administration of the experiment was described and some important limitations of the experiment and research technique were discussed.

Notes

[1] The omega-square is a strength-of-association statistic that indicates the relative amount of variance explained by the various independent factors (main effects and interaction effects). The omega-square is calculated as follows:

$$\omega^2 = \frac{SS[M \text{ or } I] - (D \text{ of } [M \text{ or } I]) \ (MSE)}{(TSS + MSE)}$$

where SS[M or I] is the sum of squares related to a main effect or interaction effect; D of [M or I] is the degrees of freedom associated with a main effect or interaction effect; MSE is the mean square error; and TSS is the total sums of squares.

[2] In a factorial design all combinations of the independent factors are presented to the subjects. This study uses a complete factorial design.

[3] This study first attempted to use a full pairwise comparison procedure for obtaining data for the experiment (described later in this chapter). One pilot subject was required to make 80 pairwise comparison judgments (using a full pairwise comparison procedure). This subject reported that he felt the task was too time consuming and fatiguing (i.e., it took about one hour for the subject to make 80 pairwise comparison judgments). Since subject time is a constraint in this study, it was decided that incomplete pairwise comparison procedures were necessary.

[4] Similar suggestions have been made for selecting standard stimuli by Young and Cliff [1972] and Mackay and Zinnes [1979].

[5] See Torgerson [1958], Chapter 10 (especially pages 234-236), for the proof that the scale values are least square estimates.

[6] These criteria were used for S selection because of the feedback received from pre-experimental interviews (see Appendix A). Based on the interviews it was concluded that this level of audit experience would be consistent with the type of judgments required in the experimental tasks.

[7] Ss were given a single context for their judgments by being told that in making their judgments they should--"consider the potential errors and irregularities that could arise due to the IACW, and focus on the significance of their impact on your minimum audit procedures under an effective system of internal control."

[8] See Appendix A for interview methodology and instrument used in the pre-experimental interviews.

[9] The abbreviations shown in parentheses will be used throughout this study to define each factor.

[10] The expected dollar effect could not be operationalized because it could not be realistically placed into the experimental setting. In the pre-experimental interviews it was found that auditors could not measure this factor as of their preliminary review of IAC.

[11]The purpose in using two standard sets was to control for experimental variation due to the incomplete pairwise comparison procedure. Ss evaluated all 12 IACWs, however, all Ss did not make the same subset of comparisons (see Figure 3.3). To evaluate whether a subset of comparisons influenced the Ss' judgments, a standard set variable (at levels A and B) was included in the group experimental design (see Kerlinger [1973]). This procedure is similar to controlling for order effects.

[12]For this pilot S, three tests were performed to see if standard sets A or B made a difference in a S's judgments. The three scales calculated for this S (full, standard set A and standard set B) were compared using both a matched-pair t-test and a Wilcoxin matched-pair signed-ranks test. Neither of these tests showed a significant difference between the three scales. Finally the three scales were correlated with each other. The three scales were significantly correlated with the following coefficients:

Scales/	Full	A	B
Full	1.00	.93	.95
A		1.00	.92
B			1.00

[13]Supra pp. 81-85 for a description and calculation of the pairwise comparison measure.

[14]If the two procedures do not produce measures of the same attribute (i.e., materiality of an IACW), it is impossible to tell what the S's responses represented. In such a case, either or neither of the procedures may have resulted in a satisfactory measure of materiality.

[15]This was necessary because in using a nonreplicated complete factorial experimental design there is only one observation per ANOVA cell. The experimental design had 11 degrees of freedom which are allocated as follows:

Effect	d.f.
Main	4
Two factor	5
Three factor	2

Hence it was necessary to use some of the interaction degrees of freedom to form the error term. The method is consistent with prior research (e.g., Ashton [1974] and Joyce [1976]) and has been recommended by Mendenhall [1968, p. 97].

[16]Nevertheless, it is acknowledged that this assumption may not always hold. Therefore, not estimating the three-way interaction is a limitation of this study.

[17]If no interactions are significant in either model (1 or 2), the description of the auditors' judgment process would be the same under either model. That is, the auditor is relying only on the main effects in his judgment and uses each factor independently. In this case, both the above models (as a whole) would be equally descriptive and have approximately the same significance level.

[18]See Note 1 on page 111 for the description of the omega-square calculation.

[19]To have a consensus measure comparable to other studies (e.g., Ashton [1974] and Joyce [1976]) the average Pearson product-moment correlation coefficient was calculated, using the S's pairwise comparison scales. Since there are only 12 scale measures per S, the stability of this correlation measure may be questionable. Therefore both the Pearson and the Spearman average correlation coefficients will be reported.

[20]This type of method for measuring self-insight has been used in several previous research studies (e.g., Slovic [1969]; Ashton [1974]; Joyce [1976]). Also Cook and Stewart [1974] examined seven different methods of eliciting subjective weights, one of which was the method used in this study. They concluded that the seven methods did not differ.

[21]Two limitations of this procedure must be noted. First, the index may be very unstable due to the small number of factors over which it is computed. However, the index is computed only to assess the general magnitude of the relationship involved, and therefore this limitation is not considered to be serious. The second limitation is that the insight-index assesses the main effects only since the S does not allocate points to the interactions. If the S's ANOVA model reveal significant interactions, this may bias the average self-insight across Ss. This may be partially compensated for by using the adjusted objective omega-squares in the correlation.

[22]This type of information is collected in most judgment oriented studies in order to help interpret individual differences between Ss and to assess the Ss motivation during the experiment (e.g., Ashton [1974]; Joyce [1976]; and Messier [1979]).

[23]The motivation questionnaire was adapted from Snowball and Brown [1979] and enables measures of intrinsic, non-monetary extrinsic and general S motivation to be obtained. Questions 10-17 in Appendix B, Booklet 4 are used to measure the S's motivation.

[24]This is the experimental design recommended by Winer [1971, chapter 7] for a group analysis in which you have repeated measures and like treatment factors within (nested) various groups (e.g., experience levels). A diagram of this group analysis for standard set and order effects is shown in Figure 3.1.

[25]The first pilot S completed similar tasks as used in this study except that he performed a complete pairwise comparison procedure. After running this first pilot S it was decided that incomplete pairwise comparison procedures were necessary due to S time constraints. All other pilot Ss performed essentially the same task as shown in Appendix B.

CHAPTER IV
RESULTS OF THE EXPERIMENT

Introduction

The experimental results are discussed in three major sections,
each corresponding to the three remaining research issues examined
in the study. The first three sections discuss: (a) the judgment
processes utilized by Ss in the IACW materiality decisions;
(b) the judgment consensus among the Ss; and (c) the degree of Ss'
self-insight. Some interpretations of the results are offered
within the chapter, but the primary implications of the results
are discussed in Chapter V. The last two sections of this chapter
contain a presentation of additional data gathered from the de-
briefing questionnaire and a summary of the results of the ex-
periment.

ANOVA Models -- Individual Analyses

As explained in Chapter III, two separate ANOVA models were
computed for each S. Model 1 included the main effects plus the
TYIAC X DOL and DOL X AS interactions, whereas model 2 included
the main effects plus the TYIAC X AS interaction. The first
criterion in choosing a S's descriptive model was to choose the
model which was statistically significant ($\alpha \leq .05$). If both models
were statistically significant, the second criterion was to choose
the model with the largest R^2. Table 4.1 presents the significance
levels and R^2s obtained in each S's models and indicates the model

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TABLE 4.1
SUBJECT'S SIGNIFICANCE LEVELS AND R-SQUARES---MODEL 1 AND MODEL 2

Subject	R^2 Model 1[a]	R^2 Model 2[b]	Subject	R^2 Model 1[a]	R^2 Model 2[b]
1	.37	.92***	19	.96***	.95***
2	.62	.88**	20	.71	.93***
3	.95**	.88**	21	.58	.88**
4	.68	.97***	22	.98***	.84
5	.97***	.98***	23	.16	.96***
6	.85	.97***	25	.34	.94***
7	.89	.94***	26	.960**	.961***
9	.15	.99***	27	.91	.98***
10	.99***	.96***	28	.957**	.960***
11	.97***	.98***	29	.99***	.98***
12	.84	.99***	30	.85	.99***
13	.89	.98***	31	.71	.99***
14	.985***	.99***	32	.52	.98***
15	.32	.96***	33	.98***	.97***
16	.68	.93***	35	.95**	.97***
17	.956**	.96***	37	.63	.91**
18	.932889**	.932882***	38	.94**	.92**

a- Model which includes TYIAC X DOL and DOL X AS interactions.

b- Model which includes TYIAC X AS interaction.

Legend

_____ = Model chosen to describe subject's judgments

*** = obtained .01 significance level for descriptive model

** = obtained .05 significance level for descriptive model

chosen to describe each $\underline{S}$'s judgment process. A review of this
table indicates that the judgment processes of 19 $\underline{Ss}$ were best
represented by model 2 and one $\underline{S}$ was best represented by model 1.
For 14 $\underline{Ss}$, both model 1 and model 2 were statistically significant.
In applying the second criterion, seven of these $\underline{Ss}$ have a larger
R^2 associated with model 1 and the seven other $\underline{Ss}$ have a larger
R^2 associated with model 2.

The $\underline{Ss}$, whose judgment processes were best described by
model 2 (19 $\underline{Ss}$), were assumed to have used the probability oriented
factors (TYIAC and AS) and DOL factors independently of each other
in making their materiality judgments. The $\underline{S}$ (22) who was best
described by model 1 was assumed to have used the materiality
factors in an expected value formulation (a more complex task in
this decision setting, since the probability factors are quali-
tative). These 20 $\underline{Ss}$ all had moderate to large interaction effects
associated with their judgment model (see Table 4.2). The judgment
processes of the 14 other $\underline{Ss}$' were largely explained by the main
effects (their models indicated no large interaction effects). It
was assumed that these $\underline{Ss}$ relied on one or more of the materiality
factors (independently of each other) in making their materiality
judgments. For the remaining analyses in this study (e.g., group
analyses and self-insight), model 1 was used to represent the
judgment processes of eight $\underline{Ss}$ and model 2 was used to represent
the judgment processes of 26 $\underline{Ss}$.

In addition to computing the ANOVA models for each $\underline{S}$, the
omega-square statistic was computed for each main effect and
two factor interaction(s) for each $\underline{S}$'s chosen model. The

TABLE 4.2

SUMMARY OF ANOVA RESULTS[a]

FACTOR	1	2	3	4	5	6	7	SUBJECT 8	9	10	11	12	13	14	15	16	17	18	19
TYPE		16**	1	12*	55*	8,3*	63*	1	1	77*	1	1*	4**	90*	13*	72*	5	63*	1:
Indl.	11**	1	16**	24*	84*		12**	14*		13*	86*	41*	80*	27*	15*	24*	7*	51*	80*
AS	15**	27**	63*	27*		n/a	84	n/a		4**	7**	26*	44*	90*		4	43**		10**
TYPE x Indl.	n/a	n/a	6	n/a	n/a	n/a	n/a	n/a	11	11	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
Indl. x AS	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a		1
TYPE x AS	57*	28**	n/a	40**	1	11**	4	84*	n/a	n/a	1	15*	9*	1	64*	28**	7	n/a	n/a
TOTAL	84	72	85	93	94	93	85	98	97	95	98	95	98	92	85	91	85	91

FACTOR	20	21	22	23	24	25	26	27	SUBJECT 28	29	30	31	32	33	35	37	81	COMPLEXITY
TYPE	4	40*	1	1	6*	18*	9**	71*	64*	70*	70*	63*	42*	79*	71	75*	81	14 8*
Indl.		1	33*	8**	18*		9**	14*	11*	9*	11*	5**	5*	11*	75*	28*	75**	59 7*
AS	6.7*	1	1	2		n/a	n/a	7	17*	14*	4*	5*	7	4*	65*			
TYPE x Indl.	n/a	n/a	14*	n/a	n/a	n/a	n/a	n/a	n/a		n/a	n/a	7	n/a	n/a	n/a		
Indl. x AS	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		1	n/a	n/a	n/a	1	n/a	n/a		
TYPE x AS	39**	72**	n/a	61*	62*			84*	n/a	n/a	14*	25*	45*	n/a	7	41*	n/a	75*
TOTAL	85		95	91	86	72	98	98	97	98	97	94	94	94	75	85	44 4

* The values chosen in this table are applicable to subjects model 1 (i.e. not estimated in model 1)

* < .01
** < .05
*** < .02

n/a interaction is non applicable to subjects model 1 (i.e. not estimated in model 1)

omega-square values represent the proportion of variance in the S's judgment which is accounted for by a particular factor or combination of factors. A summary of the ANOVA results, showing the omega-square values, is given in Table 4.2.

A review of the ANOVA results indicates that there was substantial diversity among Ss as to which of the factors accounted for the most explained variance in their judgments. The number of times each factor dominated the amount of explained variance in the Ss' judgments were: 12 for the TYIAC factor, 8 for the DOL factor, 4 for the AS factor and 10 for the TYIAC X AS interaction term. This indicates that the use of the factors was not uniform across Ss. Examples of these differences, for a few selected Ss, are highlighted in Table 4.3. S 3 relied heavily on the type of asset affected by the IACW but also gave consideration to the dollar effect of the IACW. The results for S 14 were similar to S 3 except that the former relied on all three factors, though with greatest emphasis upon the asset affected by the IACW. On the other hand, S 26 relied exclusively on the dollar effect factor with little consideration being given to the other factors. S 33 did give some consideration to the dollar effect and asset affected but his judgment variance was primarily accounted for by the type of missing IAC attribute factor. S 6 also relied heavily on the type of missing IAC attribute factor; however, a significant amount of his judgment variance was explained by the TYIAC X AS interaction effect. Finally, S 9 had most of his judgment variance explained by the TYIAC X AS interaction effect. This suggests that S 9 made his judgments in a highly

TABLE 4.3
SELECTED EXAMPLES OF DIFFERENCES IN THE IMPORTANCE
OF FACTOR USAGE TO THE VARIOUS Ss

Ss NUMBER	PERCENTAGE OF TOTAL VARIANCE IN JUDGMENT ACCOUNTED FOR BY FACTOR TERMS:			
	TYIAC	DOL	AS	TYIAC X AS
3	n/s[a]	16	62	n/a[b]
6	82	n/s	n/s	11
9	1	n/s	13	84
14	20	27	50	n/s
26	n/s	92	n/s	n/s
33	79	11	3	n/a

[a]not significant at .10 level; all others significant at $\alpha \leq$ .10.
[b]not estimated in S's chosen model.

configural manner, using the various combinations of two factors
(TYIAC and AS).

As can be seen from S 9 and Table 4.2, interaction effects
accounted for a substantial amount of judgment variance for many Ss.
Table 4.4 provides an overall analysis of the relative importance
of the IACW materiality factors and their interactions. The table
is sub-divided by the model chosen for the Ss (model 1, n=8 and
model 2, n=26) and the combination of all Ss. The three main
effects (TYIAC, DOL and AS) were significant for at least 67% of
the Ss. The TYIAC, DOL and AS significant main effects accounted
for, on the average, 37.1%, 31.9% and 20.5%, respectively, of the
variance within the Ss' judgments. Significant interaction terms

TABLE 4.4

RELATIVE IMPORTANCE OF THE IACW MATERIALITY FACTORS AND INTERACTIONS

FACTOR	NUMBER OF SUBJECTS FOR WHOM SIGNIFICANT			AVERAGE PROPORTION OF TOTAL VARIANCE ACCOUNTED FOR BY FACTOR OR INTERACTION					
				SIGNIFICANT ONES ONLY			ALL PARTICIPANTS		
	MODEL 1	MODEL 2	COMBINED	MODEL 1	MODEL 2	COMBINED	MODEL 1	MODEL 2	COMBINED
TYIAC	5	22	27	62.0	31.5	37.1	38.9	26.7	29.6
DOL	8	20	28	34.1	31.0	31.9	34.1	24.7	26.9
AS	6	17	23	20.3	20.6	20.5	14.9	13.7	14.1
TYIAC X DOL	2	n/a[a]	2	7.0	n/a	7.0	1.8	n/a	.4
DOL X AS	1	n/a	1	1.0	n/a	1.0	1.3	n/a	.3
TYIAC X AS	n/a	18	18	n/a	35.7	35.7	n/a	25.2	19.2

[a] not applicable to model

accounted for, on the average, 31.3% of the total variance within the Ss' judgments. These percentages are high compared to those obtained in previous studies. For example, Ashton [1973] reported that significant interactions accounted for 6.4% of total variance and Joyce [1976] reported 3.3% accounted for by interaction terms.

The average significant effects and average significant inter-action effects across Ss are quite different if the results are analyzed by model types. Model 1 Ss, on the average, had 62% of their significant judgment variance accounted for by the TYIAC factor. The DOL and AS factors also contributed a sizable percentage of significant variance (34.1% and 20.3% respectively) for Ss for whom these factors were significant. The average significant interaction effects, accounting for 5% of the significant variance in model 1 Ss' judgments, was similar to previous studies (e.g., Ashton [1973] and Joyce [1976]).

For model 2 Ss, on the other hand, only 31.5% of their significant judgment variance was accounted for by the TYIAC factor. The DOL and AS factors had effects similar to those for model 1 Ss, contributing a significant amount of average variance (31.0% for DOL and 20.6% for AS). The primary processing difference between model 1 and model 2 Ss is that the average significant interaction effect accounted for 35.7% of the variance in model 2 Ss' judgments. This indicates significant amount of configural processing by model 2 Ss (on the average). The interaction effect accounting for this variance was the TYIAC X AS term. Figure 4.1 sheds further light on how the Ss utilized the AS and TYIAC factors. The graph representing S 9 and S 25 indicates that an IACW that involved a
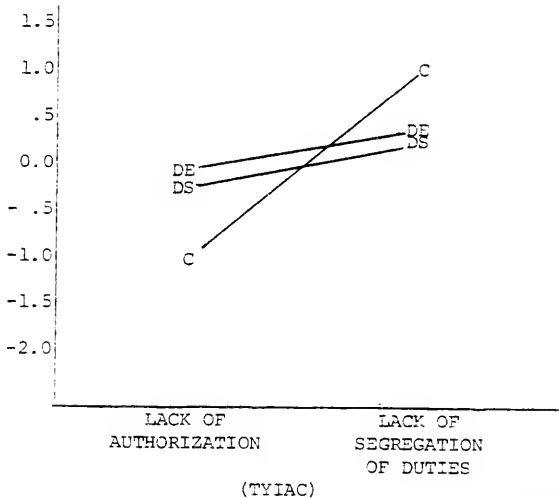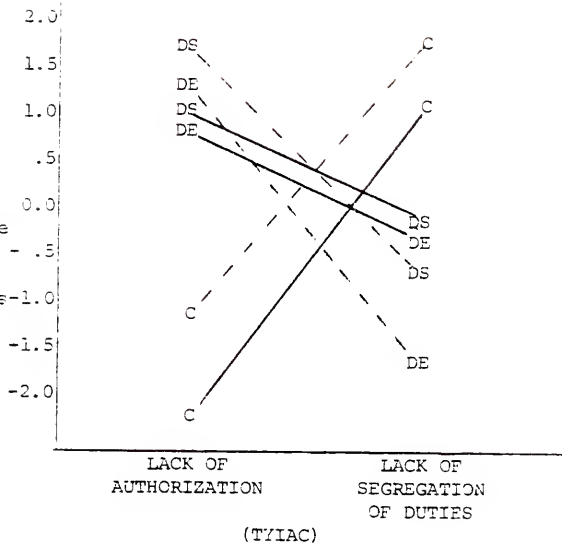
FIGURE 4.1
GRAPHS OF TYIAC X AS INTERACTION EFFECTS

lack of authorization was relatively more material if the IACW affected dental supplies or dental equipment rather than cash. On the other hand, if the IACW involved a lack of segregation of duties, the IACW would be relatively more material if it affected cash rather than dental supplies or dental equipment. Both of these Ss are representative of the other Ss who had a significant TYIAC X AS interaction effect. Further, in the composite model (all Ss) shown in Table 4.2 the TYIAC X AS interaction was significant and accounted for 9.9% of the explained judgment variance. This interaction also is illustrated in Figure 4.1 and has a similar interpretation to those of graphs S 9 and S 25. The only difference is that an IACW involving a lack of segregation of duties was always considered to be a relatively more material IACW than an IACW involving a lack of authorization, given the asset affected by the IACW. The mean responses for each S for whom TYIAC X AS effect was not significant, consistently indicate a lack of segregation of duties was considered more material than a lack of authorization.

Finally, the sum of the omega-square values for the three independent variables and their interactions is indicative of the overall percentage of variance accounted for in the dependent variable by the Ss' use of the independent variables. Thus, a high value for the summed omega-squares would indicate that the variations in the Ss' judgments were largely explained by the independent variables. The distribution of the summed omega-square values is presented in Table 4.5. A large percentage of the Ss had total omega-square values greater than .90, with no Ss having a summed omega-square value less than .70. However, the

total omega-square value for the composite model was quite low
(44.4%).[1] Since the individual ANOVA models were quite successful
in explaining within S variance, the failure of the composite model
to account for response variance indicates high between S response
variability. That is, the small omega-square value indicates a
lack of consensus among the Ss regarding the effects of the
independent variables on the IACW materiality judgment.

The general findings discussed above were both consistent and
inconsistent with previous "expert judgment" studies. First, the
findings were consistent in that 1) individual differences existed
among the weightings given to the various factors that were presented
to judges; and 2) the models explain a high proportion of the
explained variance in each S's judgments. The findings appear
inconsistent in that a high proportion of the explained variance
is accounted for by interaction terms in the Ss' models. This is
primarily true of model 2 Ss, whose models indicated a high level
of configural processing.

TABLE 4.5
DISTRIBUTION OF Ss BY TOTAL VARIANCE EXPLAINED

RANGE OF OMEGA-SQUARE VALUES	NUMBER OF Ss WITHIN RANGE	CUMULATIVE PERCENTAGE
.90 - .99	23	68
.80 - .89	8	92
.70 - .79	3	100

ANCVA Models -- Group Analyses

To help explain differences in the Ss use of the factors and
their materiality judgments, the Ss were divided into various sub-
groups (e.g., by firm and experience level). The methodologies used
to analyze these group effects, as discussed in Chapter III, were a
repeated measures ANOVA and the calculation of the average omega-
square values within these sub-groups. Table 4.6 presents a summary
of the average omega-square values of the significant effects for
all sub-groups.

The repeated measures ANOVA used to analyze the effects of
standard set and of order of presentation on the S's judgments did
not indicate any statistically significant effects due to these
variables. Table 4.6 also indicates that there were no substantial
differences between groups according to the standard set presented
or the order of presentation. That is, the amount of variance
accounted for, on the average, by the significant factor and inter-
action effects did not differ substantially between these sub-groups.

With respect to the differences due to S's firm affiliation,
the repeated measures ANOVA indicated that 1) there was a significant
difference between the Ss' mean materiality judgment responses between
firms ($\alpha=.09$), and 2) there were differences in how the firm groups
used the materiality factors. N5 rated the average relative
materiality of the IACWs higher than the other four firms. The mean
materiality ratings associated with the other four firms were not
significantly different from each other.[2] The five firm groups
appeared to apply the materiality factors in different ways. The
ANOVA indicated significant interaction effects for the FIRM X TYIAC

TABLE 4.6
AVERAGE OMEGA-SQUARE VALUES OF SIGNIFICANT EFFECTS
BY VARIOUS SUB-GROUPS

SUB-GROUP		N	AVERAGE OMEGA-SQUARES FOR SIGNIFICANT FACTOR OR INTERACTION TERM:					
			TYIAC	DOL	AS	TYIAC X DOL	DOL X AS	TYIAC X AS
STANDARD SET	A	17	30.6	26.5	12.4	0.0	0.0	18.6
	B	17	28.3	26.1	15.1	.8	.1	19.2
ORDER	1	18	26.8	22.5	17.4	0.0	.1	18.5
	2	16	32.4	28.1	9.7	.9	0.0	19.4
	N1	13	41.2	11.4	14.4	0.0	.1	16.5
	N2	7	18.3	38.0	14.7	.1	0.0	24.6
FIRM	N3	7	22.0	37.0	12.3	1.9	0.0	10.7
	N4	4	19.8	32.8	.5	0.0	0.0	37.8
	N5	3	9.0	36.0	30.0	0.0	0.0	10.3
LOCATION	HOUSTON	25	23.5	30.3	13.2	.6	0.0	21.0
	MIAMI	9	46.1	17.2	15.3	0.0	.1	13.2
EXPERIENCE	2-3 YRS	18	30.8	29.3	13.1	.7	.1	15.2
	MORE THAN 3 YEARS	16	26.1	23.7	14.5	.1	0.0	23.1
RISK ATTITUDE	HIGH RISK	6	24.3	22.7	11.3	0.0	0.0	29.0
	NEUTRAL	22	29.6	26.1	14.5	0.0	0.0	19.6
	LOW RISK	6	34.2	36.3	13.7	2.2	.2	6.3
OVERALL (including all omega-square values)		34	29.6	26.9	14.1	.4	.3	19.2

term (α=.01), the FIRM X DOL term (α=.02) and the FIRM X AS term (α=.07). These significant interaction effects are graphed in Figure 4.2. First, firm N1 was more extreme (compared to other firms) in their responses as to the difference in the relative materiality of IACWs arising from a lack of segregation of duties versus a lack of authorization. Although statistically significant, the FIRM X DOL graph indicates only slight differences between firm groups in their use of the DOL factor. Firm N5 mean materiality responses were more extreme than the other firms and firm N1 showed little mean variation between the two dollar levels. Finally, the FIRM X AS graph indicates the differences were due primarily to firm N5. N5 Ss' perceived IACWs affecting cash to be relatively more material than the Ss of the other four firms. Other differences on this graph do not appear to be extreme. Table 4.6 also indicates that the firm groups had different perceptions of the importance of the factors. N1 Ss, on the average, had more significant judgment variance accounted for by the TYIAC factor (41.2%) and much less by the DOL factor (11.4%) as compared to the other firms. N4 Ss significant judgment variance, on the average, was primarily accounted for by the TYIAC X AS interaction term (37.8%) as compared to the other firms. Finally, N5 Ss indicated a much larger reliance on the AS factor (30%) as compared to the other firms.

The above results reveal differences between firms in the IACW materiality judgments of Ss. Since all the firms were Big 8 firms, there is no obvious explanation for these differences.[3] It is possible that these differences arise because of sampling error. That is, some firms had only three (N5) or four (N4) Ss participate
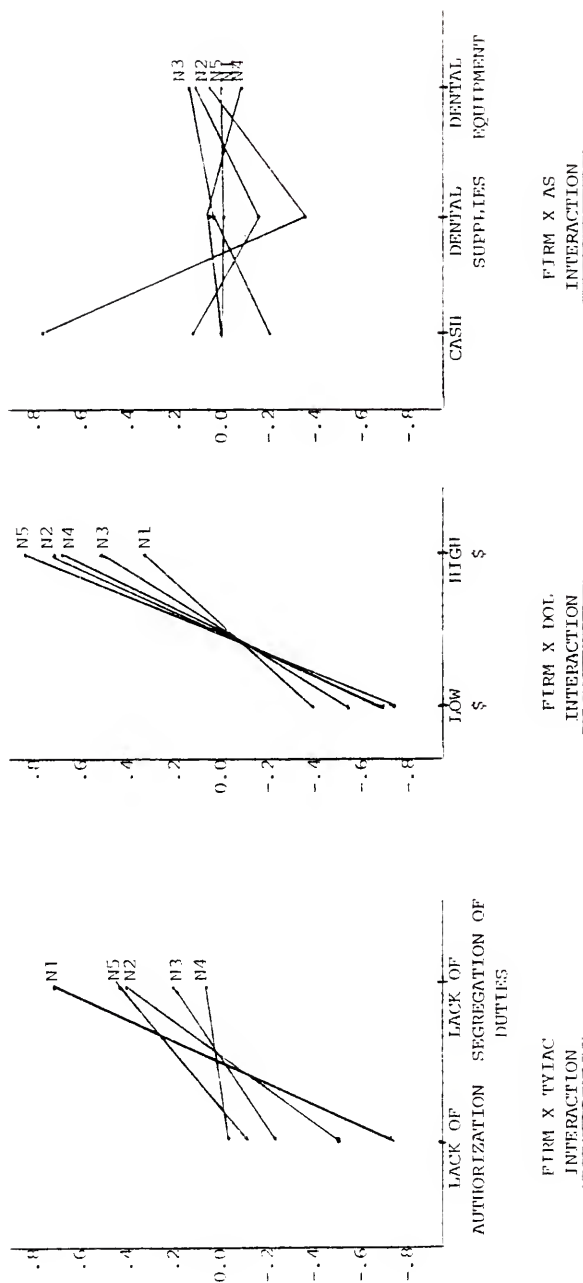
FIGURE 4.2
FIRM X FACTOR EFFECTS

in the study- and these small samples could create extreme results. Generalizability of these results clearly can not be claimed.

The next sub-group analysis involved the location of the $\underline{Ss}$. The $\underline{Ss}$ either worked in Houston, Texas (n=25) or Miami, Florida (n=9). The repeated measures ANOVA did not indicate a significant city effect. However, the ANOVA did indicate a significant effect ($\alpha=.01$) on how the two sets of $\underline{Ss}$ were affected by the missing attribute due to the IACW factor (TYIAC). That is, the CITY X TYIAC interaction term was significant. The $\underline{Ss}$ from Miami had more extreme responses to the two levels of the TYIAC factor as compared to Houston $\underline{Ss}$. Miami $\underline{Ss}$' mean ratings, as compared to Houston $\underline{Ss}$' mean ratings, indicated that an IACW involving a lack of authori- action was relatively less material and an IACW involving a lack of segregation of duties was relatively more material. Table 4.6 also showed that there were differences in how the two sets of $\underline{Ss}$ viewed the importance of the factors. Miami $\underline{Ss}$', as compared to Houston $\underline{Ss}$, primarily relied on the TYIAC factor (46.1% vs. 23.5%); whereas the Houston $\underline{Ss}$ relied on the DOL factor in their IACW materiality judgments (30.3% vs. 17.2%). These differences between the $\underline{Ss}$ of the two cities may be due to their experiences with different types of clients or due to sampling error (i.e., the Miami sample is small).

Another group analysis involved the effects of risk attitude and experience on the $\underline{Ss}$' IACW materiality judgments. The group ANOVA did not indicate any significant main effects due to the risk attitude of the $\underline{Ss}$[4] or the experience level of the $\underline{Ss}$. However, the ANOVA did indicate that these sub-groups applied the materiality

factors differently. The following three significant interactions were found: EXPERIENCE X TYIAC ($\alpha=.05$), EXPERIENCE X AS ($\alpha=.01$) and RISK X AS ($\alpha=.09$). These three interaction effects are illustrated in Figure 4.3. It appears that, on the average, Ss with more experience responded less extremely to the two levels of the TYIAC factor than Ss with less experience. Ss with more experience also viewed IACWs affecting cash to be relatively more material. Table 4.6 indicates that less experienced Ss relied on main effects, whereas, more experienced Ss had greater significant variance explained by the TYIAC X AS interaction effect. It might be hypothesized that more experience in making these judgments leads to more complex decision processing (configural) as is indicated by the higher percentage of reliance on the interaction effect.

As far as the effect of risk attitude on the Ss' materiality judgments is concerned, the primary difference was between the low risk group and the other risk groups. Figure 4.3 reveals that the relative average materiality ratings of the AS factor were similar for the high and neutral risk groups (cash most material, then dental equipment and dental supplies). The low risk group, however, rated IACWs affecting dental supplies to be the most material and IACWs affecting cash to be the least material. Table 4.6 indicates that, compared to other groups, the significant judgment variance of the low risk group was explained more by the TYIAC and DOL main effects and explained less by the interaction effects. No appealing explanation of these differences is readily available. The difference may be due to sampling error since the numbers of low risk (n=6) and high risk (n=6) Ss were small.
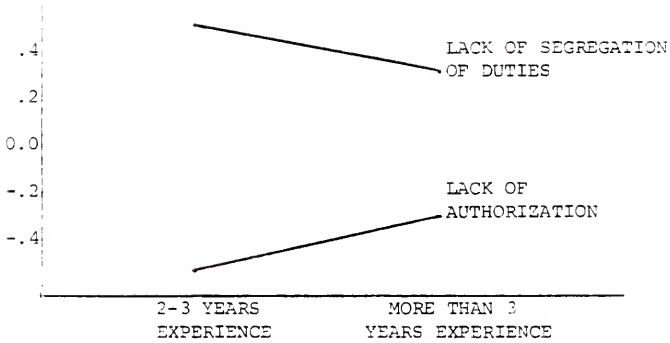
EXPERIENCE X TYIAC INTERACTION
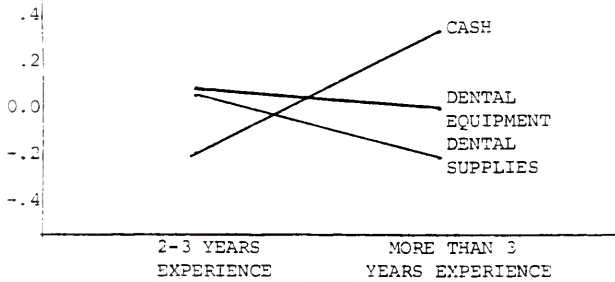
EXPERIENCE X AS INTERACTION

RISK ATTITUDE
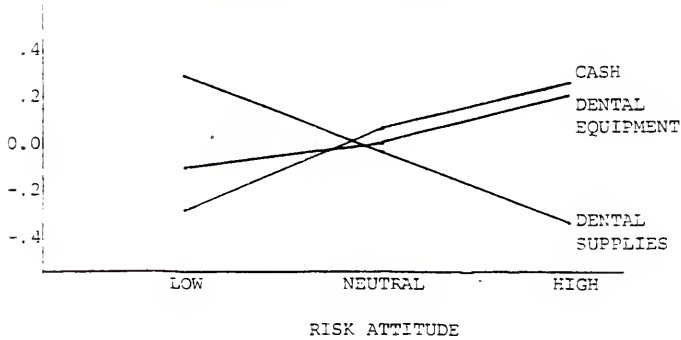
RISK X AS INTERACTION

FIGURE 4.3
EXPERIENCE AND RISK X FACTOR EFFECTS

The final group analysis performed using the $\underline{S}$s' materiality ratings was an analysis of covariance (ANCOVA). ANCOVA was used to determine what effects $\underline{S}$s' motivation or the $\underline{S}$s' time to complete the tasks had on their materiality judgments. No significant effects were found. Therefore, $\underline{S}$s' motivation or the amount of time $\underline{S}$s took to complete the task did not appear to cause any systematic differences between $\underline{S}$s.

The general findings of the group analyses do indicate that there were some systematic differences between various sub-groups on how they evaluated the materiality of the IACWs presented in the experiment. The primary differences were between firms and between experience levels of the $\underline{S}$s. These findings are reasonably consistent with previous judgment studies where it was found that $\underline{S}$s did apply the relevant factors differently between these sub-groups (Ashton [1973] and Messier [1979]). Nevertheless, the group analyses can not be generalized to either the $\underline{S}$s' firms or experience levels because the findings may be due to 1) sampling error, or 2) the fact that $\underline{S}$s were not chosen randomly from firms or experience levels. Finally, no systematic effects were found due to the experimental controls used in the study (standard set effects or order effects).

Judgment Consensus

Two assessments of consensus were made. The first consisted of computing Kendall's Coefficients of Concordance W and the associated average Spearman rank correlation coefficients for all $\underline{S}$s, firms, experience levels, cities, standard set groups and order groups.

The 561 Spearman correlation coefficients and Pearson product-moment correlation coefficients[5] were also computed for the IACW materiality ratings for each pair of Ss. The second measure of consensus computed was the percentage of Ss who agreed that an IACW was material or not material. These percentages were also calculated within firm and experience levels.

Correlation Analyses

All Kendall's Ws for agreement among Ss, firms, experience levels, cities, standard set groups and order groups were significant ($\alpha \leq .02$) and positively correlated. This significance implies that Ss were applying essentially the same standards in ranking the materiality of the IACWs. However, although Kendall's Ws showed statistically significant agreement, the average correlation co-efficients were not high.

The mean correlation across all pairs of Ss was .45 (.46). The median correlation was .46 (.50). The range was from a high of .95 (.94) to a low of -.70 (-.58). Fifty-three (45) of the 561 correlations were negative. This is considerably lower than the average consensus of .70 reported by Ashton [1974] and .665 and .670 reported by Messier [1979]. The range of Ashton's Ss was .06 to .93 and the average range of Messier's Ss was -.075 to .965. The results are more consistent, however, with judgment research in non-accounting contexts [Goldberg, 1968]; for example, the study of the judgment processes of radiologists by Hoffman, Slovic and Rorer [1968] reported a median consensus of only .38, with a range of -.11 to .83. Moreover, an auditing study by Joyce [1976] obtained a mean correlation of .373 and a range of -.687 to .937.[6]

The range values around the mean are quite wide. This, and the standard deviation for the correlations of .31 (.30), indicates a great amount of variability between $\underline{S}s$. In order to explain some of this variability, average correlations were calculated for various sub-groups. These average correlations are reported in Table 4.7.

The mean correlation within all firms was .44 (.45) and between all firms was .45 (.46). This is not substantially different than the overall $\underline{S}$ average. However, within specific firms there was some differentiation as to the amount of consensus. Firm N3 had a rather low amount of within firm consensus with an average correlation of .33 (.33). On the other hand, firm N1 exhibited a moderate level of consensus with an average correlation of .54 (.54). The other three firms were not substantially different from the overall average. The reasons for these differences are not apparent. It may be hypothesized that these differences are due to firm training effects or the amount of standardization within firms. However, since all firms were national firms, firm training differences would not be expected to be large.

The amount of consensus within and between experience levels does not differ greatly from the overall $\underline{S}$ average. It appears the amount of experience did not affect the amount of consensus.

There was a larger difference in the amount of consensus within cities. Houston $\underline{S}s$ had an average correlation of .41 (.43), whereas Miami $\underline{S}s$ exhibited greater consensus with an average correlation of .59 (.57). It may be hypothesized that this difference is due to the different type of clients between cities. The difference may also be due to sampling error since the number of Miami $\underline{S}s$ was small.

TABLE 4.7
JUDGMENT CONSENSUS AMONG Ss BY FIRMS, EXPERIENCE LEVELS,
CITIES, STANDARD SET AND ORDER GROUP

		FIRMS				AVERAGE CONSENSUS: WITHIN FIRMS	BETWEEN FIRMS
	N1	N2	N3	N4	N5		
N1	.54	.51	.43	.48	.50	.54	.48
	(.54)	(.51)	(.37)	(.41)	(.43)	(.54)	(.43)
N2		.49	.42	.48	.51	.49	.48
		(.51)	(.45)	(.52)	(.55)	(.51)	(.51)
N3			.33	.38	.35	.33	.40
			(.33)	(.43)	(.40)	(.33)	(.41)
N4				.40	.41	.40	.44
				(.40)	(.48)	(.40)	(.46)
N5					.42	.42	.44
					(.48)	(.48)	(.47)
					OVERALL:	.44	.45
						(.45)	(.46)

	EXPERIENCE LEVELS	More than 3 YRS		CITY	HOUSTON	MIAMI
	2-3 YRS					
2-3 YRS	.47 (.50)	.44 (.44)	HOUSTON		.41 (.43)	.47 (.47)
More than 3 YRS		.43 (.44)	MIAMI			.59 (.57)

	STANDARD SET			ORDER GROUP	
	A	B		1	2
A	.41 (.43)	.46 (.47)	1	.39 (.40)	.46 (.47)
B		.45 (.46)	2		.48 (.50)

OVERALL AVERAGE -- .45 (.46)

There were no substantial differences noted within either standard set groups or order groups in regards to average correlations. Each groups' consensus measure was near the overall $\underline{S}$ average. Therefore it appears neither standard sets nor orders of presentation affected the amount of $\underline{S}$ consensus.

Percentage Consensus Analysis by IACWs

The average agreement, across all $\underline{S}$s, was 73% as to whether or not the 12 IACWs were material.[7] This appears to be a moderate level of agreement (i.e., 50% would equal no consensus and 100% would equal perfect consensus). Table 4.8 summarizes, by IACW, the number and percentage of $\underline{S}$s who classified an IACW as material or not material.

From this table it can be seen that for two of the IACWs there was substantial consensus. $\underline{S}$s showed high consensus with respect to the materiality of IACWs 1 and 7 (94% and 85% respectively). This suggests that if an IACW affects cash and involves a lack of segregation of duties, auditors will tend to agree that the IACW is material. There was also a greater than average level of consensus as to the materiality of IACWs 3, 4, and 5 (79% of $\underline{S}$s considered these IACWs to be material). $\underline{S}$s exhibited considerable differences (at least 25% disagreement) as to the materiality of the seven other IACWs.

Tables 4.9, 4.10, and 4.11 present the percentage of the $\underline{S}$s' IACWs materiality classifications within firms, cities and experience levels, respectively. All firms, except N3, exhibited greater percentage agreement than the overall subject average of 73%. N2 and N5 exhibited the greatest amount of consensus (83% and 86%).

TABLE 4.8
SUBJECT MATERIALITY AGREEMENT ABOUT INDIVIDUAL IACWs

IACW # (DESCRIPTION)	NUMBER (PERCENT) OF Ss WHO CLASSIFIED IACW AS:	
	NOT MATERIAL	MATERIAL
1 (C, LSD, H)	2 (6%)	32 (94%)
2 (C, AUT, H)	21 (62)	13 (38)
3 (DS, LSD, H)	7 (21)	27 (79)
4 (DS, AUT, H)	7 (21)	27 (79)
5 (DE, LSD, H)	7 (21)	27 (79)
6 (DE, AUT, H)	10 (29)	24 (71)
7 (C, LSD, L)	5 (15)	29 (85)
8 (C, AUT, L)	25 (74)	9 (26)
9 (DS, LSD, L)	10 (29)	24 (71)
10 (DS, AUT, L)	13 (38)	21 (62)
11 (DE, LSD, L)	13 (38)	21 (62)
12 (DE, AUT, L)	16 (47)	18 (53)

OVERALL AVERAGE PERCENTAGE MATERIALITY AGREEMENT: 73%

LEGEND

C-- CASH

DS- DENTAL SUPPLIES

DE- DENTAL EQUIPMENT

LSD-LACK OF SEGREGATION OF DUTIES

AUT-LACK OF AUTHORIZATION

H-- HIGH DOLLAR EFFECT

L-- LOW DOLLAR EFFECT

TABLE 4.9

IACW MATERIALITY JUDGMENT AGREEMENT BY FIRM

IACW #[a]	N1		N2		N3		N4		N5	
	NM	M	NM	M	NM	M	NM	M	NM	M
1	0%	100%	14%	86%	14%	86%	0%	100%	0%	100%
2	69	31	57	43	57	43	100	0	0	100
3	23	77	0	100	29	71	50	50	0	100
4	31	69	0	100	29	71	25	75	0	100
5	15	85	0	100	29	71	75	25	0	100
6	31	69	0	100	29	71	75	25	33	67
7	8	92	14	86	71	29	25	75	0	100
8	85	15	57	43	71	29	100	0	33	67
9	15	85	14	86	29	71	100	0	33	67
10	38	62	14	86	43	57	50	50	67	33
11	38	62	29	71	29	71	100	0	0	100
12	46	54	29	71	43	57	75	25	67	33
AVERAGE AGREEMENT:	76%		83%		69%		81%		86%	
AVERAGE CLASSIFICATION:	33%	67%	19%	81%	36%	64%	65%	35%	19%	81%

LEGEND: a see Table 4.8 for description of the individual IACWs
NM--classified as not material
M--classified as material

TABLE 4.10
IACW MATERIALITY JUDGMENT AGREEMENT BY CITY

IACW =[a]	HOUSTON		MIAMI		
	NM	M	NM	M	
1	8%	92%	0%	100%	
2	68	32	44	56	
3	28	72	0	100	
4	24	76	11	89	
5	28	72	0	100	
6	32	68	22	78	
7	20	80	0	100	
8	80	20	56	44	
9	36	64	11	89	
10	40	60	33	67	
11	52	48	0	100	
12	52	48	33	67	
					LEGEND:
AVERAGE AGREEMENT:	70%		84%		[a]see Table 4.5 for description
AVERAGE CLASSIFICATION:	39%	61%	18%	82	NM- not material M- material

TABLE 4.11
IACW MATERIALITY JUDGMENT AGREEMENT BY EXPERIENCE LEVEL

IACW =[a]	2-3 YEARS		MORE THAN 3 YEARS		
	NM	M	NM	M	
1	11%	89%	0%	100%	
2	61	39	63	37	
3	11	89	31	69	
4	17	83	25	75	
5	11	89	31	69	
6	22	78	37	63	
7	11	89	19	81	
8	72	28	75	25	
9	17	83	44	56	
10	28	72	50	50	
11	33	67	44	56	
12	33	67	63	37	
					LEGEND:
AVE. AGREEMENT:	79%		65%		[a]see Table 4.6 for description
AVERAGE CLASSIFICATION:	17	74	40%	60%	NM- not material M- material

Both of these firms also considered more of the IACWs to be material (81% of the time), on the average, than the other firms. N4 also exhibited substantial agreement (81%), but considered more of the IACWs to be immaterial (65% of the time), as compared to the other firms. N1 and N3 displayed a similar but lesser amount of agreement (76% and 69% respectively) and apparently considered the IACWs, as a whole, to be material (67% and 64% of the time, respectively). These results indicate that within firms Ss exhibited some judgment consensus (but not substantial), about the materiality of the individual IACWs. There were differences between the firm groups on how the IACWs were evaluated. The differences between the firms may be due to different materiality thresholds used by the individual Ss (i.e., Ss in N1, N2, N3, and N5 appeared to have lower materiality thresholds for judging the materiality of an IACW, on the average, than Ss in N4.).

There were some differences noted between location of the Ss. Miami Ss exhibited greater percentage agreement (84%) than Houston Ss (70%). This is consistent with the previous correlation analysis. Miami Ss also perceived the IACWs, on the average, to be more material than Houston Ss (i.e., Miami Ss classified the IACWs to be material 82% of the time as compared to 61% of the time for Houston Ss). These results may be due to type of client experience, different materiality thresholds, or sample size.

Finally, slight differences emerged due to experience levels of the Ss. Ss with more than three years of experience showed less agreement as to the materiality of the IACWs (68% to 78%) and considered the IACWs, as a whole, to be less material. Ss with more

than 3 years of experience classified the IACWs as material 60% of the time (as compared to 73% of the time for Ss with two or three years of experience). It may be hypothesized that the more experience an auditor has (i.e., greater experience to different types of IACWs), the less likely he will consider certain types of IACWs to be material. This may be true for IACWs involving a lack of authorization since the majority of Ss with three or more years of experience considered three of six of these IACWs to be immaterial in this study.

The results of the percentage analysis appears to be consistent with the earlier results of consensus (correlation analysis). Both analyses showed that there was variability among the Ss in this study.

<div align="center">Self-Insight</div>

Self-insight refers to the extent of agreement between a) the S's description of the manner in which he weights the materiality factors in making the IACW materiality decision, and b) the adjusted statistical weights determined through the ANOVA results. The Ss' subjective weights were determined by asking each S to distribute 100 points among the three materiality factors presented in the study based on their relative importance to his judgment. The statistical weights are expressed in terms of the omega-square values, which represents the proportion of total variance in the S's judgment that is accounted for by each materiality factor.

Self-insight is discussed under two subheadings. First, a general discussion of the subjective weights indicated by the Ss in this study is presented. Second, the results of the self-insight indices are discussed.

Subjective Weights

Table 4.12 contains the values assigned to each materiality factor by the $\underline{S}$s who participated in the study. An examination of the values shows that the three materiality factors, on the average, were considered almost equally important. Dollar effects was considered the most important factor with an overall average of 35.0. This was followed by the TYIAC factor with an average weight of 33.6 and the AS factor with an average weight of 31.4. Similar averages are also found when the $\underline{S}$s are divided between model 1 $\underline{S}$s and model 2 $\underline{S}$s. The values in Table 4.12, like the statistical weights based on the omega-square values in Table 4.2, indicate a considerable amount of diversity between $\underline{S}$s.[8] Twelve $\underline{S}$s weighted the TYIAC factor as most important, followed by 11 $\underline{S}$s weighting the DOL factor as most important and 8 $\underline{S}$s weighting the AS factor as most important. Two $\underline{S}$s weighted the DOL and AS factors equally important and 1 $\underline{S}$ weighted the TYIAC and DOL factors equally important. Within $\underline{S}$ comparisons show that for many $\underline{S}$s there were substantial differences between their subjective weights and statistical weights. Table 4.13 provides some examples of these differences.

$\underline{S}$s 3 and 33 are similar to each other in that both had statistical weights which were not substantially different from their subjective weights. However, $\underline{S}$ 3 overestimated his most important factor (AS-- 70 to 62) whereas $\underline{S}$ 33 underestimated the weight of his most important factor (TYIAC-- 60 to 79). $\underline{S}$ 33 is consistent with the results of previous research which has shown that expert judges tend to underestimate the most important factors and overestimate the least important factors [Slovic and Lichtenstein, 1971]. In

TABLE 4.12
VALUE OF SUBJECTIVE WEIGHTS BY Ss

S NUMBER	FIRM NUMBER	SUBJECTIVE WEIGHT FOR FACTORS:		
		TYIAC	DOL	AS
1	N1	20	30	50
2	N1	60	25	15
3*	N1	10	20	70
4	N1	25	45	30
5	N1	35	50	15
6	N1	55	15	30
7	N1	40	25	35
9	N2	60	10	30
10*	N2	50	30	20
11	N2	30	50	20
12	N2	30	30	40
13	N2	10	60	30
14	N2	50	25	25
15	N2	40	40	20
16	N3	25	60	15
17	N3	20	40	40
18*	N3	25	30	45
19*	N3	25	35	40
20	N3	60	15	25
21	N3	30	20	50
22*	N3	20	75	5
23	N4	40	10	50
25	N4	15	70	15
26	N4	25	40	35
27	N4	5	50	45
28	N1	50	25	25
29*	N1	20	40	40
30	N1	50	20	30
31	N1	50	20	30
32	N1	50	25	25
33*	N1	60	30	10
35	N5	10	50	40
37	N5	17	50	33
38*	N5	30	30	40
*Model 1 Ss		30.0	36.2	33.8
Model 2 Ss		34.7	34.6	30.7
OVERALL AVERAGE		33.6	35.0	31.4

fact, $\underline{S}$ 3 is the only $\underline{S}$ of 15 $\underline{Ss}$ (than for whom significant inter-
actions were not revealed) who contradicted this statistical-
subjective weighting comparison. For the $\underline{Ss}$ who had significant
interactions (19 $\underline{Ss}$), this relationship can not be assessed with
any degree of objectivity. The data for the three other $\underline{S}$'s as
presented in table 4.13 reveal large differences between the two
weightings as well as differences between $\underline{Ss}$.

TABLE 4.13
SELECTED EXAMPLES OF DIFFERENCES BETWEEN $\underline{Ss}$'
SUBJECTIVE AND STATISTICAL WEIGHTS[a]

$\underline{S}$ NUMBER	TYPE OF WEIGHT[b]	MATERIALITY FACTORS:		
		TYIAC	DOL	AS
3	SU	10	20	70
	ST	1	16	62
14	SU	50	25	25
	ST	20	27	50
18	SU	25	30	45
	ST	34	51	0
26	SU	25	40	35
	ST	0	92	0
33	SU	60	30	10
	ST	79	11	3

[a] The statistical weights shown in this table are taken from the ANOVA
results summarized in Table 4.2

[b] SU = Subjective
ST = Statistical

Table 4.14 shows only slight differences in average subjective
weights due to standard set, city, or experience level sub-groups.
However, there were larger differences in average subjective weights

TABLE 4.14
VALUE OF SUBJECTIVE WEIGHTS BY VARIOUS SUB-GROUPS

| SUB-GROUP | | AVERAGE SUBJECTIVE WEIGHTS FOR FACTORS: | | |
		TYIAC	DOL	AS
STANDARD SET	A	32.5	34.4	33.1
	B	34.7	35.6	29.7
FIRM	N1	40.4	28.5	31.1
	N2	38.6	35.0	26.4
	N3	29.3	39.3	31.4
	N4	21.3	42.5	36.2
	N5	19.0	43.3	37.7
CITY	HOUSTON	32.2	36.0	31.8
	MIAMI	37.4	32.2	30.4
EXPERIENCE LEVEL	2-3 YEARS	33.0	33.6	33.4
	MORE THAN 3 YEARS	33.3	36.6	30.1
OVERALL AVERAGE		33.6	35.0	31.4

between firms. N1 and N2 weighted the TYIAC factor most heavily, whereas N3, N4 and N5 weighted the DOL factor most heavily. No explanation is apparent for these differences.

Self-Insight Index

The preceding section presented a very general discussion of subjective and statistical weights. In an attempt to examine the relationship more rigorously a self-insight index was computed for each $\underline{S}$.

The self-insight indices were developed by calculating the Pearson product-moment correlation between the subjective and statistical weights across the three materiality factors. Prior to computing the correlations, the statistical weights had been adjusted to include the effects of the interactions.[9] The indices must be interpreted with great care, however, since correlations computed over such small number of variables may be unstable. Additional instability also could have been created in the indices due to the presence of many $\underline{S}$s with highly significant interactions.

The self-insight indices for each $\underline{S}$ are shown in Table 4.15. The $\underline{S}$s' self-insight distribution also is shown as part of this table. The resultant measures of self-insight ranged from -.99 to 1.00 with a mean of .28 and a median of .51. This finding appears consistent with expert judgment studies in psychology (reviewed in Slovic and Lichtenstein [1971], pp. 683-684). For example, Slovic, Fleissner and Bauman [1972] reported an average self-insight value of .34 for their stockbroker subjects. The finding also appears consistent with the auditing study by Joyce [1976] who reported a mean (median)

TABLE 4.15
SELF-INSIGHT INDICES FOR INDIVIDUAL Ss

S NUMBER	FIRM NUMBER	SELF-INSIGHT INDEX	S NUMBER	FIRM NUMBER	SELF-INSIGHT INDEX
1*	N1	.40	21*	N3	.27
2*	N1	.12	22*	N3	.44
3	N1	.99	23*	N4	.98
4*	N1	-.75	25*	N4	-.99
5	N1	.72	26	N4	.76
6*	N1	.96	27*	N4	-.99
7	N1	.77	28	N1	1.00
9*	N2	.74	29	N1	-.99
10	N2	.98	30*	N1	.97
11	N2	.92	31*	N1	1.00
12*	N2	.31	32*	N1	.86
13*	N2	.92	33	N1	.95
14	N2	-.68	35	N5	.58
15*	N2	-.31	37*	N5	-.95
16*	N3	-.53	38	N5	-.08
17	N3	.63			
18	N3	-.84	MODEL 1 Ss		.22
19	N3	.31	MODEL 2 Ss		.29
20*	N3	-.03	OVERALL Ss		.28

*
S had highly significant interaction(s) in their ANOVA model
$(\alpha \le .05)$

DISTRIBUTION OF Ss BY SELF-INSIGHT INDEX

RANGE OF INDEX	NUMBER OF Ss WITHIN RANGE (PERCENTAGE)
.90 - 1.00	10 (29)
.60 - .89	6 (18)
.00 - .59	7 (21)
-.50 - -.01	3 (9)
-.80 - -.51	3 (9)
-1.00 - -.81	5 (14)

of .53 (.64) with a range of -.78 to 1.00. On the other hand, the scores for the present study are substantially lower than those reported by Ashton [1974] and Messier [1979]. Ashton reported a mean self-insight of .89 with only three Ss below .60. Messier reported a mean self-insight of .85 with only one S having an index measure of less than .50.

Ss in this study tended to exhibit very high self-insight or very low self-insight. Approximately 29% of the Ss had self-insight indices greater than .90, with two Ss having perfect insight. Indices greater than .60 were obtained for 47% of the Ss. About 32% of the Ss had negative indices, which indicates very poor self-insight. The dichotomy between poor and good self-insight of the Ss in this study may be partially due to the number of Ss for whom significant interactions were present. Since Ss' presumably did not consider the effects of interactions in assessing subjective weights, this may bias the self-insight indices downward. This expectation is supported by the finding that Ss with significant interactions had a mean self-insight index of .16, whereas the remaining Ss had a mean self-insight index of .40. Nevertheless, it should also be noted that some Ss with significant interactions had good insight and other Ss with negligible interactions had poor insight. For example, S 23, who had 81% of his judgment accounted for by interactions, had a self-insight index of .98; whereas, S 8, who had no significant interaction effects, had an insight index of -.84.

The data in Table 4.16 examine the effect of various sub-groups on self-insight. It appears that the grouping of Ss according to cities, experience or standard sets revealed only slight differences

TABLE 4.16
SELF-INSIGHT INDICES BY VARIOUS SUB-GROUPS

SUB-GROUP		AVERAGE VALUE OF SELF-INSIGHT INDEX
FIRM	N1	.54
	N2	.41
	N3	.03
	N4	-.06
	N5	-.15
CITY	MIAMI	.36
	HOUSTON	.25
EXPERIENCE	2-3 YEARS	.28
	MORE THAN 3 YEARS	.27
STANDARD SET	A	.30
	B	.25

in average self-insight indices. Ss grouped by firms, however,
exhibited substantial differences in the mean indices. Firms N1 and
N2 had a moderate level of mean self-insight (.54 and .41 respectively),
whereas firms N3, N4 and N5 had a low level of mean self-insight
(.03, -.06 and -.15 respectively). No ready explanation for these
differences is available. Since the poor average self-insight was
exhibited by firms with few participants, the possibility that these
results are due to a sample bias must be considered.

<div align="center">Additional Data</div>

Included in the debriefing questionnaire completed by each S
were questions concerning 1) specific comments of, and additional
information desired by, the S concerning this study, and 2) the S's
evaluation of the task.

Specific Comments and Additional Information Desired by Ss

Most Ss (20 of 34) either had specific comments concerning the
study or desired additional information in making their judgments. A
frequent comment by the Ss was that the IACW materiality judgment is a
subjective judgment and is difficult to quantify. Other responses
were more specific and directly related to this study.

Many Ss wanted more detail concerning the IACWs. These requests
generally related to more detailed flowcharts of the accounting system.
Such flowcharts were not provided to Ss because of the limited time
available to complete the experiment. The effect of their absence
upon the generalizability of the results is acknowledged. Less
frequent responses included requests for a more detailed income
statement, for prior year workpapers and for a set of minimum audit
procedures.

Task Evaluation

Each S rated the representativeness of both the IACWs and the case. A value of three on the four point scale was labeled "representative." Ninety-three percent (93%) of the Ss indicated that the experimental case was representative or very representative. The mean response to this question was 3.1. Eighty-five percent (85%) of the Ss indicated that the IACWs were at least representative and the mean response to this question was 3.0. These responses seem to indicate that Ss considered both the IACWs and case to be representative of a real audit situation, not withstanding their requests for additional information.

Summary

This chapter presented the results of the experimental study. The three objectives that composed the scope of the experiment were examined separately. The effects of various sub-groups (e.g., firm, experience) were also discussed. The major findings may be summarized as follows:

1) The Ss' models explained a high proportion of their variance in their IACW materiality judgments. The Ss' models also indicated a great amount of diversity as to the importance of the materiality factors.

2) All materiality factors manipulated in the study were considered, on the average, to be important to the S's IACW materiality judgments.

3) Significant configural processing was indicated by the judgments of the majority of the Ss.

4) The average Spearman rank correlation coefficient
   (consensus) among the Ss was .45, which represents
   a low level of agreement. There was also a
   considerable amount of variability among Ss'
   judgments, as indicated by the range of correlations
   and the standard deviation. Portions of this
   variability are accounted for by location, firm
   affiliation and experience levels. Similar results
   were obtained from a percentage of materiality
   agreement analysis.

5) The degree of self-insight of the Ss appeared to be
   low. The mean self-insight for the IACW materiality
   judgments was .28. However, there was considerable
   variability, with some Ss having high insight and
   others having very low insight. Portions of this
   variability are accounted for by interaction effects
   and firm affiliation.

These results and their significance are discussed in greater detail
in the following chapter.

Notes

[1] The composite model was calculated using the full three-way ANOVA model (i.e., all two and three-way interactions were included).

[2] These results were evaluated by using Duncan's multiple range comparison test.

[3] Differences among firms, in another materiality study, was partially accounted for by the experience of the Ss [Messier, 1979]. This effect was analyzed by testing for FIRM X EXPERIENCE interaction effects. This study, however, did not test for this effect because the sample size in many of the FIRM X EXPERIENCE cells is zero or one S (see Chapter III, Figure 3.5). Results from this type of analysis would be suspect due to these sample size problems. Therefore, FIRM and EXPERIENCE effects were analyzed separately in this study.

[4] Risk attitude was measured by a single question in the debriefing questionnaire (Appendix B, Booklet 4, Question 9). The question concerned the S's willingness to accept risk as compared to other auditors. Ss responded to this on a five point scale. Six Ss were classified as displaying a high risk attitude (more willingness to accept risk); 22 Ss were classified as having a neutral attitude toward risk (as willing as most auditors to accept risk); and the final 6 Ss were classified as displaying a low risk attitude (less willingness to accept risk).

[5] The Pearson product-moment correlation coefficients were computed in order to compare the results of this study with previous judgment studies. These coefficients will be shown in parentheses whenever the Spearman correlation coefficient is reported in this section. As will be seen from the results, there were not substantial differences (in regards to interpretation) between the two different correlation coefficients.

[6] Joyce [1976] also reported canonical correlations which were quite high. The mean was .93, with a range of .359 to 1.000. Messier [1979] also reported similar canonical correlations in his study of auditors' materiality judgments.

[7] The average agreement for this type of percentage analysis is calculated by summing the larger percentage number for each IACW and dividing by the number of IACWs. For example, the average consensus materiality agreement for IACWs, 1 and 2, across all Ss, is 78% ([94% + 62%]/2).

[8] Since there were highly significant interactions between factors for many Ss, comparisons between these two tables should be made with caution. S's subjective weights do not consider the interaction of factors. Therefore, overall average comparisons may not be meaningful and will not be made in this study.

[9] See pp. 101-102 supra for an explanation of the adjustment procedure.

CHAPTER V
SUMMARY, IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Summary of Problem, Research and Experimental Results

This dissertation examined the auditor's judgment process in making an IACW materiality decision. The auditing literature clearly has indicated the importance of judgment to this type of decision. Numerous writers have expressed concern over the lack of authoritative guidance provided to auditors in making this decision. This lack of guidance may cause inconsistent IACW materiality decisions to be made by auditors. Such decisions may arise from different auditors' emphasizing the importance of one materiality factor over another or from differences in auditors' materiality thresholds. It is possible that such inconsistent judgments may have detrimental consequences for users, public accounting firms and the profession as a whole.

The identification of inconsistencies in judgment (disagreement among auditors) is important to auditing firms, the accounting profession and users of accounting information. From a firm point of view, the cost and/or quality of the audit potentially may be affected by inconsistent judgments. A loss of public confidence in the public accounting profession also may occur if the inconsistencies are serious enough and are exposed. Users also may be affected by the increase in costs or decrease in the quality of financial information that may be associated with inconsistencies. If inconsistencies in auditor's judgments are identified, then providing

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authoritative guidance to auditors presumably would be beneficial to all the above parties.

A theoretical background (conceptual framework) was developed to aid the examination of the auditor's IACW materiality judgment. The development of this framework required an extensive review of both the IAC literature and the materiality literature. The IAC literature, to some extent, has described the auditor's judgment process in the evaluation of IAC and the identification of IACWs; the materiality literature has disclosed numerous factors relevant to various materiality decision settings. A simple, yet rigorous, definition of materiality formed an important part of this framework. The auditor's materiality decision theory was examined in terms of the available literature and the materiality definition. This led to the selection of a set of factors considered potentially relevant to the auditor's IACW materiality judgment. Certain of these materiality factors were incorporated into an experiment relating to auditors' IACW materiality judgments.

The experiment was related to only a small portion of the IACW materiality decision framework. It was presumed that the auditor's IACW materiality judgment may be partitioned into two separate components. The first component concerns the auditor's estimation of the expected dollar exposure due to the IACW. The second component relates to the auditor's evaluation of the importance of the expected dollar exposure (i.e., the comparison of the expected dollar exposure to the auditor's materiality threshold). The experiment primarily related to the first component. It provided a mechanism by which the study could evaluate the importance of the materiality factors

to the auditors' IACW materiality judgments, examined the extent of judgment consensus, and assess the extent of auditors' self-insight into their judgment process.

The experiment concerned auditors' materiality evaluation of 12 IACWs. The 12 IACWs were developed as a combination of three materiality factors related to the auditors' IACW materiality judgment. The combination of factors represented a 2 X 3 X 2 factorial design. These factors were 1) the missing IAC attribute (TYIAC---lack of segregation of duties or lack of authorization), 2) the type of asset affected by the IACW (AS---cash, dental supplies and dental equipment), and 3) the maximum dollar effect (DOL---high or low). In the study, each auditor was required to complete two tasks involving the 12 IACWs. The first task involved an incomplete pairwise comparison procedure, in which the auditor repeatedly compared the significance of one IACW to another IACW (40 different comparisons). The second task required the auditor to decide the materiality of each IACW and rate the level of materiality of the material IACWs.

There were 38 participants from five national certified public accounting firms, located in two metropolitan areas. Their experience levels ranged from two to six years.

The description of the auditors' judgment process involved the development of two ANOVA models for each auditor. The model then chosen to describe the auditors' judgment process was 1) the statistically significant model, or if necessary, 2) the model providing the greatest descriptive power (highest R^2) (i.e. if both models were significant, then the model with the highest R^2 was chosen). The first model assumed that the auditor processes the

information using an expected value combination of the materiality

factors; the second model assumed that the auditor processes the

information by using the probability oriented factors independently

of the dollar exposure oriented factor. The majority of the auditors

were described best by the second model (19 Ss) and one auditor was

described best by the first model. Both models were significant

for the remaining auditors. The judgment variance of these auditors

was accounted for by one or more main effects, which indicated

independent use of all three materiality factors. The remaining

analyses of the auditors' chosen model indicated the following:

1) individual differences existed among the auditors
   (each materiality factor manipulated was considered
   the most important by one or more of the auditors).

2) the Ss' chosen models explained a high proportion
   of the variance in each S's judgments (over 90%,
   on the average, of the variation in the Ss' judg-
   ments were explained by the independent variables).

3) there were slight differences noted in the importance
   of the materiality factors according to firm affil-
   iation, experience levels, location and risk at-
   titudes (these differences may be due to a sample
   bias, particularly in the absence of any other
   apparent explanation for these differences).

The second and third analyses concerned the extent of consensus

among the judgments of different auditors and the extent of auditors'

self-insight into their judgment process. The results of these two

analyses were

1) the mean Spearman correlation coefficient obtained
   was rather low, but considered statistically signif-
   icant, and suggested some degree of agreement among
   auditors. The Pearson product-moment correlation
   and analysis of percentage agreement on the
   materiality of the individual IACWs produced similar
   results.

2) the mean self-insight index for materiality judgments
was low. There was, however, substantial variability
around the mean. Approximately 47% of the auditors
had a moderate to good level of self-insight (index
greater than .60), whereas approximately 32% of the
auditors exhibited poor self-insight (to the extent
that the index was less than .00). This latter re-
sult may be due to the instability of the index,
since the index was constructed using only three
variables.

Implications

Implications relevant to accounting, auditing and psychology

may be derived from both the theoretical portion of this study and

the empirical portion of this study. Before considering these im-

plications, however, a fundamental limitation of the study must be

acknowledged. When a researcher uses a laboratory experiment to

examine human behavior, he or she is implicitly relegating gener-

alizability to a position of importance secondary to internal

validity. Considerable caution must be exercised in generalizing

results from experimental environments. The results of this ex-

periment are only directly applicable to the Ss who participated

and the specific IACW materiality situations incorporated in the

study. At the same time, we note that Ss apparently considered

the IACWs to be realistic and that the materiality factors that

were manipulated have both intuitive appeal and literature support

as important to the auditor's IACW materiality judgment.

The first implication of this study concerns the concept of

materiality. The definition of materiality, developed in this study,

was partitioned into two separate components (the difference between

two states of nature and the importance of that difference). Pre-

vious definitions of materiality have described only the effects of

materiality (e.g., change a decision-maker's judgment). In the con-
ceptual framework it is presumed that the difference between the two
states of nature is an objective decision.[1] With sufficient
guidance, all decision-makers (e.g., auditors, management) should
agree as to the amount of the difference. A problem for the pro-
fession is to identify the relevant factors that can be used in
estimating the expected dollar exposure. The second component,
the importance of the expected dollar exposure, remains a sub-
jective professional judgment (a value judgment). Auditors' (or
any decision-makers') materiality thresholds can not be presumed
to be the same. If inconsistent materiality decisions are con-
sidered a problem, the profession can establish arbitrary rules
as to what is important (i.e., prescribe a materiality threshold).

Each factor examined in the study can be classified as relevant
to estimating either the probability or dollar exposure of errors
due to an IACW. It is presumed that the auditor would combine two
or more of these identified factors in an expected value formulation.
The empirical study revealed no strong evidence that an expected
value formulation was used by the participants.[2] This result was
not unexpected since the materiality decision concerned the prelim-
inary evaluation of IAC. The auditor normally would not have
quantitative assessments of the probability oriented factors at this
point in the audit. The quantitative assessment of the probability
oriented factors would be made at a later point in the audit (after
compliance or substantive tests). Thus the study does not exclude
the possibility that "final" IACW materiality decisions are made
using an expected value formulation.

In the experiment it was found that the TYIAC X AS interaction effect was significant for the majority of Ss. An interpretation of this interaction may be that these Ss were combining the two surrogates for probability in such a way as to derive a single estimate of probability. The results suggest that these auditors considered that an IACW involving a lack of segregation of duties and affecting cash has a greater probability of material errors occurring than IACWs which involve a lack of segregation of duties and affect non-cash assets. This is consistent with Ashton's [1973] results in which segregation of duties was found to be an important attribute in a "payroll" accounting system. On the other hand, participants in the present study appeared to view an IACW that involves a lack of authorization and affected cash as having a smaller probability of material errors occurring than IACWs involving a lack of authorization and affecting non-cash assets. These results may imply that an auditor attaches a different amount of importance to an IAC attribute (segregation of duties vs. authorization), dependent upon the IAC system (cash disbursements, inventory control, etc.) under consideration by the auditor.

The experiment also provides evidence of the existence of individual differences among auditors' judgments concerning the materiality of an IACW. These individual differences appear to emerge as differences in the use of factors by the auditors and as differences in the auditors' materiality thresholds. The finding does not necessarily imply that immediate steps should be taken to eliminate these differences. First, additional studies need to be performed to extend and replicate the findings of this study.

Second, the appropriate course of action is dependent upon the benefits derived from eliminating these differences and the costs of reducing them. No research has been done in this area. It should be noted that most audit decisions are subject to an "audit review" (i.e., a review by managers and partners) and initial decisions are thus subject to change. Such a review process may eliminate some of the individual differences noted in this study.

The low degree of consensus does not imply a lack of competence on the part of the auditors who participated in this study. The IACW materiality decision is very abstract and the auditing literature may provide insufficient criteria for auditors to apply in estimating the expected dollar exposure due to an IACW. Even if auditors had specific criteria and were familiar with them, there is no assurance that the auditors would use the same materiality threshold. If one considers the uncertainty of the environment faced by the audit profession today, the results of this study may reflect positively on the profession. In fact, the degree of consensus found in this study (.45) is consistent with that found among some other professionals on tasks of similar im-portance [Slovic and Lichtenstein, 1971].

With some exceptions, the auditors in this study showed a low degree of self-insight (mean correlation of .28). No implications can be derived from this finding. First, the index used in this study may be very unstable, especially when consideration is given to the number of factors the index was derived from and to the number of significant interactions. Second, the IACW materiality decision is a new type of decision made by auditors. Auditors may

not have enough experience in making this decision to the extent of knowing the factor relationships they are applying. With the recent emphasis the profession has given to the evaluation of IAC and the expected additional training auditors will receive in this area, it may be expected auditors' self-insight will improve in this area.

The number of significant interactions in this study suggests that the auditors were highly configural processors of information. This appears to be inconsistent with previous research (e.g., Ashton [1973], Slovic [1969]). However, an explanation for this apparent inconsistency may be offered. The primary interaction (TYIAC X AS) involved two probability oriented factors. Some of the auditors in this study may have used the two factors to derive a single probability estimate of a material error occurring due to an IACW. Had the study provided a single factor called "probability", these auditors may not have exhibited substantial configural processing. In other words, configural processing may be anticipated if the factors (cues) represent elements (components) of an overall general concept (e.g., probability). Hence, this study is consistent with previous research if it is assumed that these auditors had their judgment variance primarily accounted for by two "main" effect factors, a "probability" factor and a dollar factor.[3]

Future Research

Since this study is considered an exploratory study of the auditor's IACW materiality decisions, several avenues of future research may be suggested. The first area of research concerns the concept of materiality. Research needs to be performed to

examine 1) the relationship of surrogate factors to the estimation of the expected dollar exposure (i.e., rules of correspondence need to be developed between the observable factors and the probability distribution of dollar exposure); 2) the relationships of the expected dollar exposure of auditors to the expected dollar exposure of management and to the expected dollar exposure of users (it was assumed in this study that if an error is made, the expected dollar exposure for all these parties would increase); and 3) the level of materiality thresholds used by auditors (this research may be done by holding the expected dollar exposure constant).

A second area of research is to attempt to extend the generalizability of the experiment. This may be done by replication or extensions of this study. A different set of auditors (e.g., auditors from a variety of firms rather than only national firms), and variation in the set of materiality factors are two of many modifications that may be warranted. In terms of the dependent variables, the examination of auditor's consistency over time would be a worthwhile topic of future research. These studies may also utilize a more representative design (as did the studies by Boatsman and Robertson [1974] and Mock and Turner [1978]). This would require the use of factual and perhaps less accessible information (e.g., actual audit workpapers) rather than hypothetical experimental information.

Another area of future research would be to examine the sequential process of the auditor's IACW materiality judgment. This includes examination of both the audit review process and group decisions of audit teams (i.e., the group decisions of the senior, manager and partner). One purpose of this research would be to

examine the amount of reduction in judgment variance (i.e., in-
dividual differences) as compared to the cost of reducing the
variance.

Future research may also seek additional evidence concerning
the need for specific guidelines in evaluating the materiality of
IACWs. This research may include examination of the heuristics
used by auditors. Simplifying decision rules should be identified
and studied (e.g, through process tracing) in order to see the ef-
fects on the audit process and on materiality decisions. If such
research indicates that auditors have similar materiality thres-
holds, but make different materiality decisions, guidelines need
to be established to help auditors make their materiality decisions
(e.g., develop supplementary audit programs which consider a
potential set of IACWs and the materiality of those IACWs).

A final area for future research involves the psychological im-
plications (particularly those relating to the extent of configural
processing) of this study. This research could examine decisions
which can incorporate factors that directly represent a general
concept (e.g., probability) or incorporate factors which represent
elements of the general concept (e.g., surrogates or sub-factors
of probability). The objective would be to determine the task
conditions under which configural processing may be expected versus
the task conditions in which configural processing is unlikely.

Judgment is an essential part of the audit process. In the
evaluation of IAC, IACWs and materiality auditor's judgment is
critical and requires the use of abstract factors. Decisions are
not made on the basis of quantitative factors only. This

dissertation has shown that these abstract judgment situations can

be examined empirically, with some rigor. It is hoped that this

study will provide some assistance to future research that

examines the concept of materiality and the auditor's judgment

process in IAC evaluation.

Notes

[1]It is acknowledged that this presumption is subject to empirical
verification.

[2]The experiment, however, did not specifically test for an
expected value formulation. The ANOVA models are only a description
and not assumed to be a true representation of the participants'
cognitive processes.

[3]An alternative explanation for the amount of configural
processing is the task performed by the Ss. The pairwise comparison
task may have influenced the type of processing used by a S. The
Ss materiality decisions were made as a comparative IACW evaluation
and not by an individual IACW rating. This may have allowed (or
influenced) the Ss to identify a relationship among the factors
while making their comparisons, thereby accounting for the TYIAC X AS
effect. This explanation, however, is somewhat discounted because
Ss did rate the individual IACWs and the ANOVA models calculated from
these ratings appeared to produce similar interaction effects.
Nevertheless, the single rating task was always performed after the
pairwise comparison task and this may have biased the Ss in their
single rating task. Therefore, this alternative explanation is
still viable and acknowledged.

APPENDIX A
PRE-EXPERIMENTAL INTERVIEWS

Introduction

The objective of this appendix is to report the methodology
used in the pre-experimental interviews. The general purposes of
this pre-experimental interviews were the following: 1) to obtain
a limited justification for the materiality factors derived in
Chapter II that were concluded to be important in the IACW
materiality decision; 2) to obtain an understanding on how the
materiality factors may be used and measured by an auditor in his
IACW materiality judgment during his preliminary evaluation of
IAC; and 3) to obtain other relevant information necessary in the
designing of the experiment, presented in Chapter III (e.g., who
makes the preliminary judgment about the materiality of an IACW?).
This appendix is organized by first presenting the interview
methodology, followed by a copy of the interview instrument.

Interview Methodology

Type of Interview

Interviews may be classified as either unstructured or structured.
The primary difference between the two is that the structured interview
uses a standardized interview schedule (questionnaire), whereas the
unstructured interview has no interview schedule. However, the
structured interview still allows for flexibility and interchange

between the interviewer and the participant. That is, the interview schedule may be deviated from in order to clarify questions for the participant and to probe deeper into a participant's response. Since the purpose of the interviews, in this study, was to obtain specific information about a particular judgment within a limited amount of time, the structured interview format was used.[1]

Interview Instrument

The interview instrument consisted of seven sections (a copy of the interviewer's materials and participant's materials are presented on pages 170 through 184 of this appendix). The first page of the interviewer's materials is a summary of the introduction which was verbally presented to the participant. The introduction included: a) the purposes of the interview, b) the specific subject matter of interest, c) a guarantee of confidentiality of the interview, and d) the assumptions to be made by the participant in answering the questions. The objectives of the introduction were 1) to put the participant at ease in order to allow for a freely flowing discussion and 2) to give the participant general information about the purpose of the study and a general frame of reference----"I AM INTERESTED IN YOUR [The Participant] PERCEPTION OF HOW YOU MAKE A JUDGMENT THAT AN IACW IS MATERIAL DURING THE PRELIMINARY EVALUATION OF THE CLIENT'S IAC SYSTEM."

---

[1]The interviews for each participant (CPA) had to be completed in a reasonable amount of time (i.e., one to three hours) in order to receive maximum cooperation from the participant.

The first part (Section A) of the interview consisted of open-ended questions concerning who makes the initial materiality decision of an IACW during the preliminary evaluation of IAC. The purposes of these questions were to obtain information about who would be the appropriate subjects for the experiment in this study (presented in Chapter III) and to learn more about the sequential process of this materiality decision and how the decision is documented.

The second part (Section B) of the interview was an open-ended question concerning how the auditor evaluates the materiality of an IACW during the preliminary evaluation of IAC. The purpose of this section was to allow the participant to suggest any factors that he considers important in his materiality judgment, before being potentially biased by the set of factors (derived in Chapter II) included in subsequent interview questions.

The third (Section C) and fourth (Section D) parts of the interview instrument consisted of a series of objective weighting questions and a self-weighting allocation task, respectively (both sections reviewed in Chapter II). One purpose of these sections was to obtain information about how auditors used the materiality factors, which satisfied the factor selection criteria applied in Chapter II. A second purpose was to determine how important the interview participants perceived these factors to be in an IACW materiality decision.

The fifth part (Section E) of the interview instrument asked the subject to define a material IACW. Its purpose was to elicit the frame of reference used by the participant in answering the objective portion of the interview. This question helped provide

insight as to why the subject considered particular factors to be important in his materiality judgment.

The sixth part (Section F) of the interview instrument was to find out when the final materiality judgment is made concerning an IACW. The reasons for this question were to obtain information about the sequential process of the materiality judgment and to see how the overall audit may affect this judgment.

The final section of the interview involved general open-ended questions. The participant, at this time, was given more information as to the precise purpose of the interview (e.g., to help design an experiment using the factors as experimental variables). The participant was then asked whether or not there were other important factors that should be included in designing the experiment, and did he have any comments or suggestions related to the judgment problem or to the conduct of this study. The reasons for this section were to allow the subject to vent any frustration that may have been created due to the forced response questions [Kerlinger, 1973] and to alert the researcher to any aspects of the materiality judgment that may have been overlooked in the interview.

Subjects

The participants in the interviews were four audit managers from four national CPA firms. The primary reason for such a small sample was that although interviews are an excellent method for obtaining information, they are costly and time consuming [Kerlinger, 1973]. While the small sample size does not allow any statistical inferences to be made from the results (see Chapters II and III), this limitation

was not considered a major drawback. The interview approach was used mainly as an exploratory device to provide additional information to assist in selecting among the factors noted in the literature (Chapter II). Finally, audit managers were used as interview subjects because of their presumed experience with the IACW materiality judgment. It was assumed, a priori, that in-charge seniors are the individuals who currently make the initial IACW materiality judgment. Since audit managers are one position above the senior, they would have had the most diverse and recent experience with this type of judgment. Therefore, they would be able to provide the most information about this judgment.

All participants were located in Jacksonville, Florida. The participants had a similar amount of audit experience and all have audited a diversified set of clients. The interview took place in each participant's office, except for one which took place at the participant's home. The length of the interview ranged from 1 1/2 hours to 3 hours. Permission was received to tape record the interviews, except in the case of one subject. Notes were also taken by the interviewer on the face of the interviewer's materials during the course of the interview. All participants appeared cooperative and receptive to being interviewed and all expressed an interest in receiving the final results of the study.

INTERVIEWER'S MATERIALS

NAME (PARTICIPANT) _____

FIRM NAME   _____

POSITION IN FIRM _____

-1-

4) i) During the preliminary evaluation of internal accounting control who generally makes the decision that a particular internal accounting control weakness is material or not?

[If the interviewee says that there is no one who makes this decision because they do not make a materiality judgment at this point in time---- then find out when the judgment is made and carry on the rest of the interview with this in mind]

ii) a) Is this decision reviewed?

b) By whom?

5) In general, how do you evaluate the materiality of an internal accounting control weakness during the preliminary evaluation of internal accounting control?

INTERVIEWER'S PREFACE (Verbal Presentation)

I.) Introduce myself (Ph.D. student, working on dissertation involving auditor's evaluation of internal accounting control weaknesses and materiality.).

II.) Purpose of Interview--I need help from practitioners to develop an understanding on how auditors evaluate the materiality of IACWs (ala--SAS No. 20), therefore I am interviewing 4-5 auditors from the big eight firms. All results from these interviews <u>will</u> <u>be</u> <u>kept</u> <u>strictly</u> <u>confidential</u>. All individuals and their firm affili- ation will remain anonymous. (Interview approximately 1 hour and no more than 2 hrs.)

Now: i.) May I tape record our discussion?

   ii.) Please feel free to ask any questions during our discussion.

III.) My particular interest during this interview is to learn something about how <u>you</u>, as an auditor, make a particular decision. Independent auditors are required to evaluate a client's IAC system. The reasons for this evaluation are given in the professional standards. An additional requirement established by SAS No. 20--- "Required Communication of Material Weaknesses in Internal Accounting Control", is that auditors communicate to management and the board of directors or its audit committee material weaknesses in IAC that come to their attention during the audit. SAS No. 20 states that one way the auditor may become aware of a material IACW is through his <u>initial</u> review of the system.

I AM INTERESTED IN YOUR PERCEPTION OF HOW YOU MAKE A JUDGMENT THAT AN IACW IS MATERIAL DURING THE PRELIMINARY EVALUATION OF THE CLIENT'S IAC SYSTEM. I WOULD LIKE YOU TO ASSUME THROUGHOUT OUR DISCUSSION THAT COMPENSATING STRENGTHS (CONTROLS) ARE NOT PRESENT. THAT IS, I AM INTERESTED IN THE MATERIALITY JUDGMENT RELATED TO AN IACW THAT HAS NO COMPENSATING STRENGTHS.

IV.) Up to this point, is everything clear?---Do you have any questions?

V.) Sequential organization of interview:
   Questions: 1) Ai, Aii a and b, B (verbal responses)
              2) C (objective likert type questions--written response)
              3) review of objective answers--detail questions (verbal response)
              4) D (allocation of 100 points among factors---written response)
              5) General questions E and F (verbal response)
              6) Non-identifying demographic data (written response)
              7) Wrap-up questions Section (verbal response) and THANK YOU

-2-

C) Factors related to the Internal Accounting Control Weakness Materiality Judgment

Instructions:
   I am interested here in your views on what factors associated with
   internal accounting control weaknesses influence the judgment of the materiality
   of an internal accounting control weakness. during the auditor's preliminary
   evaluation of internal accounting control. Please answer this section by
   circling the ONE number (on each scale) which best represents your beliefs.

QUESTION: In determining whether an internal accounting control weakness is or is not
          material, how important is each of the following factors in making your
          materiality decision?

1. The expected dollar exposure to the client from the weakness.

1	2	3	4	5	6	7	8	9
NOT AT ALL IMPORTANT				MODERATELY IMPORTANT				EXTREMELY IMPORTANT

2. The missing internal control attribute created by the weakness (e.g., lack of segregation of
   duties, no approval, no authorization, no double-checking, etc.).

1	2	3	4	5	6	7	8	9

3. The potential error rate from the internal accounting control weakness.

1	2	3	4	5	6	7	8	9

4. The costs and benefits of correcting the internal accounting control weakness.

1	2	3	4	5	6	7	8	9

5. The size of the client.

1	2	3	4	5	6	7	8	9

6. The type of assets or transactions affected by the internal accounting control weakness
   (e.g., cash, sales, purchases, physical plant, etc.).

1	2	3	4	5	6	7	8	9

7. The quality of personnel associated with an accounting function.

1	2	3	4	5	6	7	8	9

8. The quality of management.

1	2	3	4	5	6	7	8	9

Next, I would like to review your answers from the previous section. In particular,
I would like to know why you consider these factors to be important or unimportant.

First---[review factors considered to be moderately important or not at all important].

  a) Why did you consider (factor) to be [unimportant or moderately important]?

Factor =___

Factor =___

Factor =___ .

Factor =___

Factor =___

Factor =___

Second---[review factors considered to be important]

  a)Why did you consider (factor) to be important?

  b)How much information is available about (factor)?

  c)How much information do you need to know about (factor)?

  d)How do you measure this (factor) in making the materiality judgment?

  e)When is the (factor) too high (low)---can you provide an example?
    (That is, at what levels do these factors indicate a material, or immaterial IACW?)

Factor =___

Factor =___

Factor =___

Factor =___

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D)   Please allocate 100 points to the factors associated with the materiality judgment of an internal accounting control weakness according to how important each factor is in making your materiality judgment (i.e., important factors should be assigned more points than less important factors, and the total points should equal 100.).

EXPECTED DOLLAR EXPOSURE DUE TO WEAKNESS   _____

MISSING INTERNAL CONTROL ATTRIBUTE CREATED BY THE
WEAKNESS (e.g., lack of segregation of duties)   _____

POTENTIAL ERROR RATE   _____

COSTS/BENEFITS OF CORRECTING THE WEAKNESS   _____

SIZE OF THE CLIENT   _____

THE TYPE OF ASSETS OR TRANSACTIONS AFFECTED   _____

THE QUALITY OF PERSONNEL ASSOCIATED WITH AN ACCOUNTING FUNCTION   _____

THE QUALITY OF MANAGEMENT   _____

OTHER FACTORS (PLEASE STATE AND DESCRIBE BRIEFLY)

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

                                     TOTAL   100

-4-

E) In general, how do you define a material internal accounting control weakness?

F) When is the final materiality decision made in regard to an internal accounting control weakness?

After discussing page 4 with the auditor---describe the experiment I am trying to design.

The purpose of asking you about the importance of the factors related to your judgment of the materiality of an IACW was to identify the most important factors which can then be used in designing a field experiment. I want to isolate the most important factors that auditors use in this materiality judgment so I can develop a realistic scenario (incorporating these factors)which would involve the IACW materiality judgment. (elaborate as need be---use of audit seniors as subjects in an experiment in which the factors are experimental variables and manipulated at various levels---any questions about the experiment?)

With this in mind---

1)Do you think I covered the most important factors associated with the materiality judgment of an internal accounting control weakness? (If no--What other factors should I include? Why?)

2)Do you think I asked the right questions? What did I leave out?

3)Do you have any comments or suggestions about the problem. or about this interview?

-5-

Please answer the following:

1)HOW MANY YEARS HAVE YOU BEEN EMPLOYED AS AN AUDITOR? _____YEARS.

  HOW MANY YEARS HAVE YOU BEEN IN YOUR PRESENT POSITION? _____YEARS.

2)DO YOU CONSIDER YOURSELF AN INDUSTRY SPECIALIST?   YES____   NO____

  IF YES____WHAT INDUSTRY(IES)? _____

  _____

  _____

3)WHAT PERCENTAGE OF <u>YOUR</u> CLIENTS ARE:

	PUBLICALLY-HELD	_____%
	CLOSELY-HELD	_____%
	NON-PROFIT	_____%
	OTHER	_____%
		100 %

4)WHAT IS THE TYPICAL SIZE OF <u>YOUR</u> CLIENTS IN TERMS OF:

    SALES $_____   TOTAL ASSETS $_____

    EMPLOYEES IN THE ACCOUNTING FUNCTION _____

    OTHER SIZE DESCRIPTIONS_____

    _____

    _____

PARTICIPANT'S MATERIALS

(To be given to participant after the presentation of the preface)

-1-

A. i) During the preliminary evaluation of internal accounting control who generally makes the decision that a particular internal accounting control weakness is material or not?

[If the interviewee says that there is no one who makes this decision because they do not make a materiality judgment at this point in time---- then find out when the judgment is made and carry on the rest of the interview with this in mind]

ii) a) Is this decision reviewed?

b) By whom?

B) In general, how do you evaluate the materiality of an internal accounting control weakness during the preliminary evaluation of internal accounting control?

-2-

C) Factors related to the Internal Accounting Control Weakness Materiality Judgment

Instructions:
I am interested here in your views on what factors associated with internal accounting control weaknesses influence the judgment of the materiality of an internal accounting control weakness, during the auditor's preliminary evaluation of internal accounting control. Please answer this section by circling the ONE number (on each scale) which best represents your beliefs.

QUESTION: In determining whether an internal accounting control weakness is or is not material, how important is each of the following factors in making your materiality decision?

1. The expected dollar exposure to the client from the weakness.

1	2	3	4	5	6	7	8	9
NOT AT ALL IMPORTANT				MODERATELY IMPORTANT				EXTREMELY IMPORTANT

2. The missing internal control attribute created by the weakness (e.g., lack of segregation of duties, no approval, no authorization, no double-checking, etc.).

1	2	3	4	5	6	7	8	9

3. The potential error rate from the internal accounting control weakness.

1	2	3	4	5	6	7	8	9

4. The costs and benefits of correcting the internal accounting control weakness.

1	2	3	4	5	6	7	8	9

5. The size of the client.

1	2	3	4	5	6	7	8	9

6. The type of assets or transactions affected by the internal accounting control weakness (e.g., cash, sales, purchases, physical plant, etc.).

1	2	3	4	5	6	7	8	9

7. The quality of personnel associated with an accounting function.

1	2	3	4	5	6	7	8	9

8. The quality of management.

1	2	3	4	5	6	7	8	9

-3-

D)   Please allocate 100 points to the factors associated with the materiality
      judgment of an internal accounting control weakness according to how impor-
      tant each factor is in making your materiality judgment (i.e., important
      factors should be assigned more points than less important factors, and the
      total points should equal 100.).

EXPECTED DOLLAR EXPOSURE DUE TO WEAKNESS   _____

MISSING INTERNAL CONTROL ATTRIBUTE CREATED BY THE
WEAKNESS (e.g., lack of segregation of duties)   _____

POTENTIAL ERROR RATE   _____

COSTS/BENEFITS OF CORRECTING THE WEAKNESS   _____

SIZE OF THE CLIENT   _____

THE TYPE OF ASSETS OR TRANSACTIONS AFFECTED   _____

THE QUALITY OF PERSONNEL ASSOCIATED WITH AN ACCOUNTING FUNCTION   _____

THE QUALITY OF MANAGEMENT   _____

OTHER FACTORS (PLEASE STATE AND DESCRIBE BRIEFLY)

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

                                                  TOTAL   100

-4-

E) In general, how do you define a material internal accounting control weakness?

F) When is the final materiality decision made in regard to an internal accounting control weakness?

-5-

Please answer the following:

1)HOW MANY YEARS HAVE YOU BEEN EMPLOYED AS AN AUDITOR? _____YEARS.

   HOW MANY YEARS HAVE YOU BEEN IN YOUR PRESENT POSITION? _____YEARS.

2)DO YOU CONSIDER YOURSELF AN INDUSTRY SPECIALIST?   YES____   NO____

   IF YES____WHAT INDUSTRY(IES)? _____

   _____

   _____

3)WHAT PERCENTAGE OF YOUR CLIENTS ARE:

   PUBLICALLY-HELD   ____ %

   CLOSELY-HELD   ____ %

   NON-PROFIT   ____ %

   OTHER   ____ %

   100 %

4)WHAT IS THE TYPICAL SIZE OF YOUR CLIENTS IN TERMS OF:

   SALES $_____   TOTAL ASSETS $_____

   EMPLOYEES IN THE ACCOUNTING FUNCTION _____

   OTHER SIZE DESCRIPTIONS_____

   _____

   _____

APPENDIX B
EXPERIMENTAL MATERIALS

BOOKLET NUMBER 1

INTRODUCTION, INTRUCTIONS AND BACKGROUND INFORMATION

Dear Participant:

    I would like to take this opportunity to thank you for
participating in this study. A number of other auditors will
also be participating in the study. In reporting the results
of this study all individuals and their associated firms will
remain anonymous.

    Your careful consideration of the information provided and
the questions asked will help to ensure reliable and meaningful
results.

    Again, thank you for your time and assistance in this
project.

                    Sincerely,

                    Alan Mayper

INTRODUCTION

This study is concerned with, and only with, how you evaluate internal accounting control weaknesses. The general purpose of the study is to describe the auditor's judgment process in this evaluation. There are 30-40 auditors participating in the study. In reporting the results of this study all individuals and their firm affiliations will remain anonymous.

The information that will be provided to you includes both general information about the hypothetical company involved, as well as specific information on those internal accounting control systems where weaknesses were noted during an audit of this company. Please read the information carefully and attempt to make your decisions in terms of the setting provided. I realize that the following materials do not include all the information you might like to have for your decisions. However, as with many real situations, it is not always possible to have all the information you would like. For this reason, please respond to the best of your ability on the basis of the information that has been provided.

Thank you for your cooperation and participation.

GENERAL INSTRUCTIONS

You are about to be presented with two different tasks which relate to your pre-
liminary evaluation of Agmer Dental Products' internal accounting control weaknesses.
The tasks you are to perform are to help identify how you evaluate internal account-
ing control weaknesses. There are no right or wrong answers, nor good or bad per-
formance in these tasks. Presently we know little enough about how auditors do
evaluate internal accounting control weaknesses, let alone how they should. You are
to complete each task independently, in the prescribed order given. Once a task is
completed you should review it only to ensure that you have answered all the quest-
tions before preceding with the next task.

You should assume that it is now November, 1979 and you have been given pertinent
information concerning your firm's audit of Agmer Dental Products (ADP) for the year
ended December 31, 1979. Your firm has performed the ADP audit since the company went
public in 1977 and in all years has rendered an unqualified opinion. ADP has opera-
tions located in both Michigan and California. An audit report is prepared for each
location as well as a consolidated report. The whole audit is fully staffed by your
office. You have been assigned by your firm to be the senior-in-charge of the audit
for the current year. You may assume the information you are about to receive,for
your review, has been compiled by the audit manager assigned to the audit. The infor-
mation pertains to the internal accounting control weaknesses identified during the
audit work, performed prior to compliance testing and the substantive testing.

Before proceeding to the first task, you should review the background information
and the information pertaining to the internal accounting control weaknesses, Assume
that on the basis of the review of internal accounting control, it has been deter-
mined that ADP's personnel perform their duties adequately. Assume also that the
executive personnel are considered to be capable, that ADP is in good financial con-
dition and is expected to maintain a steady level of growth in the upcoming years.

The specific information included in the case relates only to the areas where
internal accounting control weaknesses were identified. Assume that the weaknesses
are independent of each other; that they are not compensated for by internal accounting
control strengths elsewhere; nor have they been corrected or are planned to be cor-
rected by management.

The procedures to follow when responding to each task are:

1) Review the Summary on Internal Accounting Control weaknesses on pages 4 thru 7.

2) Review (as you feel necessary) the Background Material or the General
   Instructions.

3) Perform the task as specifically described in the tasks' instructions.

4) Remember, complete each task fully and review for completeness, then and only
   then go the the next task---do not return to the task once you have completed
   it.

Your materials should include the following:

1) Task Number 1 and instructions (Booklet No.2--proceed to this task when ready)
2) Task Number 2 and instructions (Booklet No.3)
3) Post-Task Questionnaire (Booklet No. 4).

ADP BACKGROUND INFORMATION

ADP is incorporated under the Laws of the State of Delaware. It is primarily engaged in the wholesale of Dental Supplies and Dental Equipment. ADP produces a limited amount of dental supplies for sale (e.g., precious metal alloys (gold &silver) for dental fillings and crowns, dentures, etc.)

The dental supplies sold by ADP includes:
- --dental crowns and fillings (made of gold, silver, platinum & palladium)
- --dental floss, flourides, brushes and plaque removers
- --dental hand instruments and dental burrs

The dental equipment sold by ADP includes:
- --vacuum and drilling equipment
- --x-ray machines
- --operatory units

Each business segment (supplies and equipment) accounts for approximately 50% of the sales and income of ADP.

The manufacturing and warehousing operations of the company are performed in only two cities - located in Michigan and California). Sales and administrative operations are conducted by personnel working out of offices located at each warehouse site. In addition, some sales are made by independent commission dealers and agents. The company currently has 310 employees as follows:

	Michigan	California	Total
Manufacturing and Warehousing	120	25	145
Office sales, administrative and executive personnel	130	35	165
Total Employees	250	60	310

All sales are made to dealers and dental depots, dental laboratories, and dental and affiliated technical schools. Sales take place throughout the United States and salesmen are trained as technicians in the product areas.

The company was begun in Michigan in 1967 by its current president and treasurer, John Long, as a small family enterprise. Because of continued growth in demand the company expanded to a second location in 1972. Each location has a great deal of autonomy and each operate independently in both segments of the business. The account-ing systems are standardized at each location, but not centralized. The Michigan lo-cation accounts for approximately 85% of the business and the California location ac-counts for 15% of the business. In 1977 the company went public, with the family retaining only a 5% interest in the company. All executive personnel have been with the company for at least 5 years, with the only exception being the general counsel who was hired when ADP went public. All department managers and clerical staff have been with the firm at least 2 years and there have been no resignations or dismissals. Employee-employer relationships have been excellent. The turnover in warehousing and sales personnel has been minimal (1 employee in 1979), and in fact, there has been an average net increase of 3 employees per year in total personnel. Today it is still run very much like a family operation with most employees on a first name basis. An organization chart of the company is given on page 2.

Finally, ADP is in good financial condition and expects to maintain a steady level of growth in the upcoming years. It has maintained a competitive position in its industry and has not been involved in any major legal problems. There is no reason to believe that any of this will change in the foreseeable future. The anticipated balance sheets at December 31, 1979 and estimated income before income taxes and sales are given on page 3.

ADP Organization Chart (As of November 1979)
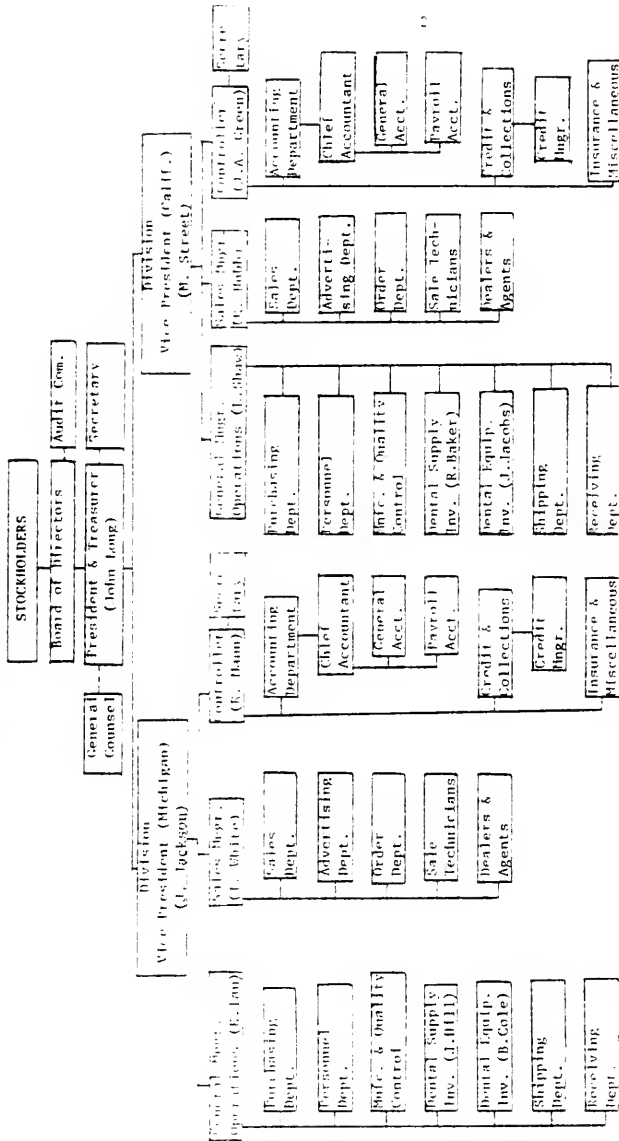
3

It is anticipated that the Balance Sheets at December 31, 1979, would closely resemble the following ('000 omitted):

ASSETS		Michigan	California	Total
	Cash	$ 600	$ 5	$ 680
	Accounts Receivable	3,000	270	3,270
	Inventories:			
	Dental Supplies	2,000	400	2,400
	Dental Equipment	3,400	510	3,910
	Prepaid Expenses	230	50	280
	Current Assets	$ 9,230	$1,310	$10,540
	Property, Plant and			
	Equipment (Net)	4,400	750	5,150
	Other Assets	350	20	370
		$13,980	$2,080	$16,060

LIABILITIES				
	Notes Payable	$ 2,310	$ 180	$ 2,490
	Accounts Payable	1,250	310	1,560
	Accrued Expenses	870	74	944
	Estimate Income Tax	40	6	46
	Current Liabilities	$ 4,470	$ 570	$ 5,040
	Long-term Liabilities	4,720	750	5,470
	Deferred Income Taxes	200	30	230
	Total Liabilities	$ 9,390	$1,350	$10,740

STOCKHOLDERS' EQUITY:

	5,320
	$16,060

Furthermore, it is anticipated that the income before income taxes and sales during 1979 will be: ('000 omitted)

	Michigan	California	Total
Income before income taxes	$ 2,100	$ 280	$ 2,380
Sales	$23,200	$3,500	$26,700

Summary of Internal Accounting Control Weaknesses---ADP

Weakness	Location	Description
1. The chief accountant signs checks (for less than $1,000) and is responsible for the check register and the voucher register.	Michigan	The chief accountant receives the voucher packages once a week. He controls all blank checks, check-signing machine key and his signature plate. Only his signature is required on checks for less than $1,000 (checks for greater than $1,000 requires two signatures, as stated on the face of the check.). When he receives the voucher packages, he prepares the checks and stamps the voucher "paid". He then forwards the check for mailing. Next he records the amount of the voucher in the check register and the voucher register, which is kept in his office. All vouchers are then filed alphabetically. The approximate total cash disbursements for less than $1,000 was about $6.2 million during 1979.
2. Robert Mann, Division Controller does not adequately approve vouchers (no signature or initials) before cash disbursements for less than $1,000.	Michigan	Robert Mann receives the voucher packages once a week. Vouchers that involve cash disbursements for less than $1,000 are reviewed by him for adequate documentation. However, he does not formally document this review. Once he reviews the vouchers, he forwards them for check preparation (Vouchers that involve cash disbursements for greater than $1,000 needs formal approval of John Jackson, Division Vice-President.). The approximate total cash disbursements for less than $1,000 was about $6.2 million during 1979.
3. Joe Hill, Dental Supply Inventory storekeeper is also responsible for the perpetual dental supply inventory records.	Michigan	All Dental supply inventory is kept in an inside fenced area with Joe Hill having sole control over the access. Joe is also in charge of the perpetual records which are updated when he issues or receives any dental supplies. The approximate total purchases was $6.3 million during 1979.

Summary of Internal Accounting Control Weaknesses---ADP (continued)

Weakness	Location	Description
4. There is no formal authorization (signature or initials) given to release dental supply inventory to shipping.	Michigan	The sales manager prepares a shipping bill of materials. The original is sent to the storekeepers department and the copy is filed in the sales department. There is no evidence of any authorization on the shipping bill of materials. Joe Hill receives the bill of materials and issues the dental supplies to the shipping department. The approximate total cost of dental supply shipments during 1979 was $6.0 million.
5. Bill Cole, Dental Equipment warehouseman is also responsible for keeping the dental equipment perpetual records.	Michigan	All dental equipment is kept in a separate small warehouse adjacent to the administrative and operations plant. Bill Cole has sole control to the access to the warehouse. Bill is also in charge of keeping the perpetual records which are updated when he receives or issues any dental equipment. The approximate total dental equipment purchases during 1979 was $6.4 million.
6. No written authorization (signature or initials) is given for the release of dental equipment from the warehouse to shipping.	Michigan	When the dental equipment is sold, the sales manager prepares a shipping bill of materials. The original is sent to the dental equipment warehouse and the copy is filed in the sales department. There is no evidence of any authorization on the shipping bill of materials. Bill Cole receives the shipping bill of materials and issues the dental equipment to the shipping department. The approximate total cost of dental equipment shipments was $6.1 million during 1979.

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Summary of Internal Accounting Control Weakness---ADP (continued)

Weakness	Location	Description
7. The chief accountant signs checks (for less than $1,000) and is responsible for the check register and the voucher register.	California	The chief accountant receives the voucher packages once a week. He controls all blank checks. Only his signature is required on checks for less than $1,000 (checks for greater than $1,000 requires two signatures, as stated on the face of the check.). When he receives the voucher packages, he prepares the checks and stamps the voucher "paid". He then forwards the checks for mailing. Next he records the amount of the voucher in the check register and the voucher register, which is kept in his office. The approximate total cash disbursements for less than $1,000 was about $1.3 million during 1979.
8. Jo Ann Green, Division Controller does not adequately approve vouchers (no signature or initials) before cash disbursements for less than $1,000.	California	Jo Ann Green receives the voucher packages once a week. Vouchers that involve cash disbursements for less than $1,000 are reviewed by her for adequate documentation. However, she does not formally document this review. Once she reviews the vouchers, she forwards them for check preparation (vouchers that involve cash disbursements for greater than $1,000 needs formal approval of Mike Street, Division Vice-President.). The approximate total cash disbursements for less than $1,000 was about $1.3 million during 1979.
9. Roy Baker, Dental Supply Inventory storekeeper is also responsible for the dental supply inventory perpetual records.	California	All Dental supply inventory is kept in an inside fenced in area with Roy Baker having sole control over the access. Roy is also in charge of the perpetual records which are updated when he receives or issues any dental supplies. The approximate total purchases was $1.35 million during 1979.

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Summary of Internal Accounting Control Weaknesses---ADP (continued)

Weakness	Location	Description
10. There is no formal authorization (signature or initials) given to release dental supply inventory to shipping.	California	The sales manager prepares a shipping bill of materials. The original is sent to the storekeepers department and the copy is filed in the sales department. There is no evidence of any authorization on the shipping bill of materials. Roy Baker receives the bill of materials and issues the dental supplies to the shipping department. The approximate total cost of dental supply shipments during 1979 was $1.2 million.
11. John Jacobs, Dental Equipment warehouseman is also responsible for keeping the dental equipment perpetual records.	California	All dental equipment is kept in a separate small warehouse near the administrative and operations plant. John Jacobs has sole control to the access to the warehouse. John is also in charge of keeping the perpetual records which are updated when he receives or issues any dental equipment. The approximate total cost of dental equipment purchases during 1979 was $1.4 million.
12. No written authorization (signature or initials) is given for the release of dental equipment from the warehouse to shipping.	California	When the dental equipment is sold, the sales manager prepares a shipping bill of materials. The original is sent to the dental equipment warehouse and the copy is filed in the sales department. There is no evidence of any authorization on the shipping bill of materials. John Jacobs receives the shipping bill of materials and issues the dental equipment to the shipping department. The approximate total cost of dental equipment shipments was $1.25 million during 1979.

7

BOOKLET NUMBER 2

Task Number 1

Instructions

At this time you will want to review and place next to you the Summary of Internal Accounting Control Weaknesses. Remember, you are free to refer to the case materials at any time.

The individual weaknesses are numbered 1 through 12 on the Summary, and this is how they will be referred to in the questions below. The task involves your judgment of the significance of an Internal Accounting Control Weakness (IACW) to the preliminary evaluation of internal accounting control. In making your judgments assume the following:

1) Consider the significance of the IACW to ADP Inc. as a WHOLE, not by individual divisions.
2) Consider the POTENTIAL ERRORS AND IRREGULARITIES THAT COULD ARISE due to the IACW, and FOCUS ON the SIGNIFICANCE of their impact on your MINIMUM AUDIT PROCEDURES under an EFFECTIVE SYSTEM OF INTERNAL CONTROL.
3) Assume that THE POTENTIAL ERROR RATE DUE TO THE SPECIFIC IACW IS THE SAME FOR EACH OF THE 12 IACWs GIVEN.
4) Assume that EACH weakness is INDEPENDENT of each other.

For the following IACWs, rate each case as to their comparative significance to the preliminary evaluation of internal accounting control: (Place an X in the middle of the space like : X :)

EXAMPLE:

IACW #1   is a: Much More: 3 : 2 : 1 : 0 : 1 : 2 : 3 :Much Less   significant IACW than #j.

    3 = very close to that end
    2 = moderately close to that end
    1 = somewhat close to that end
    0 = neutral

Note: a) Auditors who have performed this task reported that, after the first few responses, the task became progressively easier and quicker as their familiarity with the weaknesses increased.
      b) The seven point scales are necessary for the purposes of making statistical analysis of responses.

Please proceed to the task and answer ALL questions.

                    3   2   1   0   1   2   3

IACW #1   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #8.

IACW #4   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #2.

IACW #4   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #10.

IACW #12 is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #1.

IACW #2   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #1.

(2)

3   2   1   0   1   2   2

IACW #2   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #9.

IACW #4   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #9.

IACW #10 is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #1.

IACW #1   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #7.

IACW #10 is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #8.

IACW #11 is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #1.

IACW #8   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #12.

IACW #8   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #4.

IACW #3   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #8.

IACW #9   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #12.

IACW #9   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #11.

IACW #6   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #4.

IACW #11 is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #6.

IACW #9   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #5.

IACW #6   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #7.

IACW #2   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #8.

IACW #9   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #10.

IACW #5   is a: Much More:___:___:___:___:___:___:___:Much Less   significant IACW than #1.

(3)

<u>3　　2　　1　　0　　1　　2　　3</u>

IACW #5　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #8.

IACW #11　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #8.

IACW #6　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #2.

IACW #7　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #8.

IACW #10　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #6.

IACW #12　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #6.

IACW #4　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #1.

IACW #3　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #1.

IACW #6　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #5.

IACW #9　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #3.

IACW #7　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #9.

IACW #6　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #3.

IACW #8　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #2.

IACW #1　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #11.

IACW #8　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #12.

IACW #3　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #8.

IACW #4　is a:　Much More:___:___:___:___:___:___:___:Much Less　significant IACW than #9.

Please review all questions now to ensure that you have a response for <u>each</u>
question. After completing this task, please turn to the next booklet.

BOOKLET NUMBER 3

Task Number 2

(Proceed to this Task only after full completion of Task Number 1.----Thank you)

Instructions

At this time you will want the Summary of Internal Accounting Control Weaknesses in front of you; you may refer to the other materials as you deem relevant. The individual Internal Accounting Control Weaknesses (IACWs) will be referred to by the Summary sequence numbers (i.e., 1 - 12).

This task involves your individual perception of the IACWs to your preliminary evaluation of internal accounting control. You are first asked to give a "yes" or "no" response as to whether or not each IACW is a material IACW to ADP Inc. (as a whole company not by individual division) as to your preliminary evaluation of internal control. That is, consider THE MATERIALITY OR IMMATERIALITY of the POTENTIAL ERRORS OR IRREGULARITIES THAT COULD ARISE due to the IACW, and FOCUS ON the MATERIALITY of their impact on your MINIMUM AUDIT PROCEDURES under an EFFECTIVE SYSTEM OF INTERNAL CONTROL. Then you are asked to indicate your rating on a 1 to 5 point scale of the level of materiality for each IACW in which you responded "YES" in the first part of the task. If you responded YES to the first question, then you would interpret the rating scale where:

    1 = indicates to you that this IACW is "barely a material IACW for ADP Inc. as a whole and you would barely expand your minimum audit procedures."

and 5 = indicates to you that this IACW is "a very material IACW for ADP Inc. as a whole and you would considerably expand your minimum audit procedures."

In making your judgments assume the following:
1) Assume THAT THE POTENTIAL ERROR RATE DUE TO THE SPECIFIC IACW IS THE SAME FOR EACH OF THE 12 IACWs GIVEN.
2) Assume that EACH IACW is INDEPENDENT of each other.

You may now proceed to the task below (please answer all questions)

As of your preliminary evaluation of internal accounting control, do you perceive this IACW to be a material IACW? (circle yes or no)

Individual rating of IACW if first response was "yes" (per above 1 to 5 scale--circle the appropriate response per your judgment)

IACW #1:
    NO

    YES . . . .
        1   2   3   4   5
    ****
    barely   very
    material   material

IACW #2:
    NO

    YES . . . .
        1   2   3   4   5
    ****

IACW #3:
    NO

    YES . . . .
        1   2   3   4   5
    ****

IACW #4:
    NO

    YES . . . .
        1   2   3   4   5
    ****

(CONTINUE ON NEXT PAGE)

2

As of your preliminary evaluation of internal accounting control, do you perceive this IACW to be a material IACW? (circle yes or no)

Individual rating of IACW if first response was "yes" (per 1 to 5 scale--circle the appropriate response per your judgment)

IACW #5:
NO
YES . . . .
1   2   3   4   5
****
barely   very
material   material

IACW #6:
NO
YES . . . .
1   2   3   4   5
****

IACW #7:
NO
YES . . . .
1   2   3   4   5
****

IACW #8:
NO
YES . . . .
1   2   3   4   5
****

IACW #9:
NO
YES . . . .
1   2   3   4   5
****

IACW #10:
NO
YES . . . .
1   2   3   4   5
****

IACW #11:
NO
YES . . . .
1   2   3   4   5
****

IACW #12:
NC
YES . . . .
1   2   3   4   5
****

After completing this task, please turn to the next booklet.

BOOKLET NUMBER 4

POST-TASK QUESTIONNAIRE

(Please complete this questionnaire after completion of all the tasks---Thank You)

Post-Task Questionnaire

1) Now that you have completed the tasks, please allocate 100 points to three materiality related factors that were contained in the Summary of Internal Accounting Control Weaknesses. Allocate the points in such a way as to indicate the <u>relative importance</u> of each factor when making your decisions involving the relative materiality of each IACW to ADP Company. <u>The more important factor should be assigned more points than the less important factor, and the total points should equal 100</u>.

_____ points----<u>Missing IAC attribute</u> (e.g., lack of segregation of duties or the lack of formal authorization.)

_____ points----<u>Type of Asset affected by the IACW</u> (e.g., cash, dental supplies, or dental equipment.)

_____ points----<u>The approximate flow of total Dollar exposure through the IACW</u>

__100__ TOTAL POINTS

2) How realistic or representative did you find the case (i.e., ADP) to be' (circle one number)

Very unrepresentative	1
Unrepresentative	2
Representative	3
Very representative	4

3) How realistic or representative did you find the Internal Accounting Control Weaknesses to be? (circle one number)

Very unrepresentative	1
Unrepresentative	2
Representative	3
Very representative	4

4) Would you have found additional information helpful in completing the tasks? (circle one number)

Yes	1
No	2

Please identify the information if you answered Yes. _____

_____

_____

_____

_____

_____

2

5) To the nearest year, how many years have you been employed as an auditor? _____ years.

6) Do you consider yourself an industry specialist? (circle one number)

                                            Yes   1   What Industry?_____

                                              No   2

7) Have you ever audited a Dental Supply Wholesaler? (circle one number)

                                              Yes   1

                                              No   2

8) Are you a CPA? (circle one number)

                                              Yes   1

                                              No   2

9) Compared with other auditors, how do you view your willingness to accept risks? (circle one number)

                                       Much more willing   1

                                         More willing   2

                                         As willing as most   3

                                           Less willing   4

                                           Much less willing   5

Please respond to questions 10-17 by circling the appropriate response. This is not a test; there are no right or wrong answers. It is important that you try to answer each question honestly.

10) Suppose this same experiment was repeated in the future. Would you be willing to participate again?

```
**************************************************************
    *        *        *        *        *        *        *
Definitely   No     Probably   Don't   Probably    Yes   Definitely
    No                 No       Know      Yes                Yes
```

11) Did your desire to perform well in undertaking a challanging task cause you to try very hard?

```
**************************************************************
    *        *        *        *        *        *        *
Definitely   Yes    Probably   Don't   Probably    No   Definitely
   Yes                 Yes      Know       No                No
```

3

12) Did you enjoy making the decisions required in the experiment?

```
********************************************************
   *        *        *        *        *        *        *
Definitely  No    Probably  Don't   Probably   Yes   Definitely
   No               No      Know      Yes               Yes
```

13) Are you satisfied with your performance in the experiment?

```
********************************************************
   *        *        *        *        *        *        *
Definitely  Yes   Probably  Don't   Probably   No    Definitely
   Yes              Yes      Know      No                No
```

14) Did you feel tense during the experiment?

```
********************************************************
   *        *        *        *        *        *        *
Definitely  Yes   Probably  Don't   Probably   No    Definitely
   Yes              Yes      Know      No                No
```

15) Did your desire to cooperate with the experimenter cause you to try very hard?

```
********************************************************
   *        *        *        *        *        *        *
Definitely  No    Probably  Don't   Probably   Yes   Definitely
   No               No      Know      Yes               Yes
```

16) Did you enjoy the overall experience of participating in the experiment?

```
********************************************************
   *        *        *        *        *        *        *
Definitely  No    Probably  Don't   Probably   Yes   Definitely
   No               No      Know      Yes               Yes
```

17) Did your desire to contribute to research knowledge cause you to try very hard?

```
********************************************************
   *        *        *        *        *        *        *
Definitely  Yes   Probably  Don't   Probably   No    Definitely
   Yes              Yes      Know      No                No
```

18) If you have any comments about the experiment and/or experimental materials, please
    record them here.

_____

_____

_____

_____

4

19) Please indicate if you are interested in receiving the results of this study.

_____NO _____YES (Please check), with names of individuals and/or firms not re-

vealed.

If YES, please indicate: Name _____

Address_____

_____

THANK YOU VERY MUCH FOR YOUR COOPERATION.

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

_____
Charles L. McDonald, Chairman
Associate Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

_____
Douglas A. T. Snowball
Associate Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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William F. Messier, Jr.
Assistant Professor of Accounting

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Graduate Faculty of the School of Accounting in the College of Business Administration and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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